Environmental Report 2019

Joy brings us together

KIRIN

2019.10

Contents

About this Environmental Report

Editorial Policy

The Kirin Group consists of its Integrated Beverages Business, which covers Japan, Oceania, and Asia, its Pharmaceuticals and Bio-chemicals Business, and other businesses, with the Integrated Beverages Business, including overseas operations, accounting for approximately 80% of net sales. Initiatives to address the environmental issues are positioned as one of the three key issues of CSV (the creation of value that can be shared with society), which is the core of our management strategy for the realization of sustainable growth. The editing of this report has taken into account the characteristics of the Kirin Group's business and the positioning of its environmental approaches.

Location of Corporate Information Disclosure

Information on the corporate activities of the Kirin Group, including this Report, discloses a diverse range of information in the interests of shareholders and investors, as well as the interests of a wide range of stakeholders in our local communities, including our customers.

Kirin Holdings CSV Website
https://www.kirinholdings.co.jp/english/

Kirin Holdings Investor Relations Information
https://www.kirinholdings.co.jp/english/ir/library/

KIRIN GROUP ENVIRONMENTAL REPORT
https://www.kirinholdings.co.jp/english/csv/report/env/

KIRIN REPORT 2018 (Integrated Report)
https://www.kirinholdings.co.jp/english/ir/library/integrated/

LION SUSTAINABILITY REPORT
http://lionco.com/sustainability/sustainability-reports

KYOWA KIRIN Annual Report
http://ir.kyowa-kirin.com/en/index.html

Reporting Period

FY2018 (January–December 2018)
Where necessary, this report also contains historical data showing trends for the past 3 to 5 years.

Organizations Covered by this Report (FY2018)

Business	Company
Japan Beer and Spirits Businesses	Kirin Brewery, Kirin Distillery, SPRING VALLEY BREWERY, Eishogen Kirin Brewery (Zhuhai)
Japan Non-alcoholic Beverages Businesses	Kirin Beverage, Shinshu Beverage, Kirin Beverage Value Vendor Hokkaido Kirin Beverage, Kirin Maintenance Service, KIRIN Tropicana each site of Kirin Beverage Service (Hokkaido, Sendai, Tokyo, Chubu, Kansai) Hakodate Daiichi Vending, KIRINVIVAX, Tokai Beverage Service
Oceania Integrated Beverages Business	Lion
Pharmaceuticals and Bio-chemicals Businesses	Kyowa Kirin (Formerly Kyowa Hakko Kirin, name changed in July 2019), Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, Kyowa Hakko Kirin China Pharmaceutical, BioKyowa Inc., Shanghai Kyowa Amino Acid, Thai Kyowa Biotechnologies
Other Businesses (all companies included)	Mercian, NIPPON LIQUOR, Daiichi Alcohol, Wine Curation, Myanmar Brewery Interfood, Vietnam Kirin Beverage, Azuma Kirin, Four Roses Distillery Kirin Holdings, Kirin, Kirin Business Expert, KIRIN BUSINESS SYSTEM, KOIWAI DAIRY PRODUCTS, Kirin Echo, Kirin and Communications, Kirin Engineering, Kirin City, Kirin Techno-System, KIRIN GROUP LOGISTICS

Calculation Method of Environmental Data

About Calculation Method of Environmental Data →P.82~84

Reference Guidelines

GRI Standards
Environmental Reporting Guidelines (FY2018 version),Ministry of the Environment of Japan
Task Force on Climate-Related Financial Disclosures (TCFD) (2017)
Draft framework for reporting environmental information & natural capital, Climate Disclosure Standards Board (CDSB) (October 2014 version) →P.95~98

Forward-looking statements in this report, including forecasts, targets, and plans, are based on the current assessments by management at the time of preparation of the report. They contain inherent uncertainty that the outcomes will differ from the statements in this report due to changes in a variety of factors. Statements about risks and opportunities are also included in the report from the perspective of proactive information disclosure, even if they do not necessarily constitute risk factors that would have a material impact on investor decisions. The Kirin Group will, upon identification and acknowledgment of various risks associated with its business, strive to strengthen its risk management structure and to prevent and mitigate those risks, and will make its best efforts to respond to risks that become apparent.

Message from Top Management

President and CEO
Kirin Holdings Company, Limited
Yoshinori Isozaki

In 2019, the Kirin Group established the Kirin Group Vision 2027 (KV2027), its long-term management vision for the next stage of its growth.
KV2027 declares a vision for the Group to become a global leader in CSV by 2027 by creating value in domains ranging from food & beverages to pharmaceuticals. CSV, which has been the foundation of the Kirin Group's management since 2012, is a concept that seeks to realize sustainable growth by contributing to solutions to social issues through business and creating social value and economic value at the same time. Companies will no longer be able to survive unless they are able to walk a path together with society.
The Kirin Group views the environment as one of the most important social issues that it must address, alongside health and well-being, community engagement, and our responsibility as an alcoholic manufacturer which is the premise of these two issues. For the past six years, as part of our Long-Term Environmental Vision, we have led the industry in our efforts to realize a society that is based on 100% recycling, including obtaining approval for our SBT and switching completely to FSC® certified paper.
In December 2018, we became the first company in the Japanese food and beverage industry to express support for the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD). In our climate-related scenario analysis, continuing on from last year's trials, we tested a number of scenarios, including detailed identification of the long-term impact of climate change on agricultural products, confirmation of the impact of the water stress resulting from climate change, and, further, energy price fluctuations, and have confirmed the resilience of our management strategies to these impacts.
In addition to these initiatives, this fiscal year, we will revise the Long-Term Environmental Vision and engage in higher targets in response to global concerns about the natural environment, such as natural disasters caused by climate change and the issue of ocean plastics, and to the growing expectations being placed on companies.

Corporate Philosophy

KIRIN brings joy to society by crafting food and healthcare products inspired by the blessings of nature and the insights of our customers.

2027 Vision

A global leader in CSV, creating value across our world of Food & Beverages to Pharmaceuticals

"One KIRIN" Values

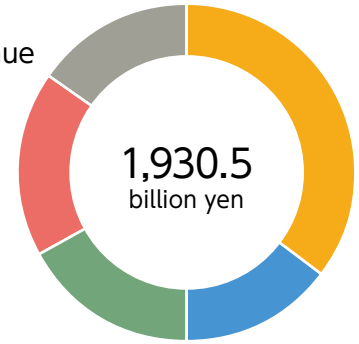
Passion Integrity **Diversity**

Corporate philosophy	KIRIN brings joy to society by crafting food and healthcare products inspired by the blessings of nature and the insights of our customers.
2027 vision	A global leader in CSV, creating value across Food & Beverages to Pharmaceuticals
Outcomes	Create economic value (Financial targets) Create social value (Non - financial targets)
Strategy framework	Value creation with Society / Value creation with Consumers Organizational capabilities for innovation Consumer centric marketing / Technology creating trusted value Diversity and Inclusion, Culture for innovation / ICT accelerating value creation
Values "One Kirin" Values	"Passion, Integrity, Diversity"

Corporate Data

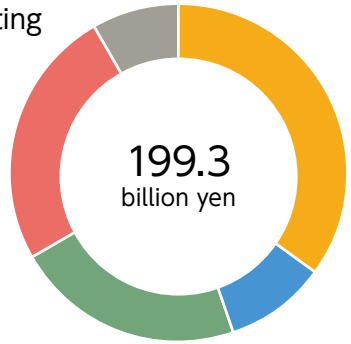
Trade Name	Kirin Holdings Company, Limited
Date of Incorporation	February 23, 1907 *The Kirin Group adopted International Financial Reporting Standards (IFRS) in December 2017. For details, please refer to the Financial and Non-Financial Highlights of KIRIN REPORT 2018.
Head Office	NAKANO CENTRAL PARK SOUTH 10-2, Nakano 4-chome, Nakano-ku, Tokyo 164-0001, Japan +81-3-6837-7000 [Information Desk]
President and CEO	Yoshinori Isozaki
Paid-in Capital	102,045,793,357 yen
Number of Employees	30,464employees on a consolidated basis (as of December 31, 2018)
Main Business	Developing group-wide management strategies and overseeing their implementation

Sales revenue



Japan Beer and Spirits Businesses	35.5%
Japan Non-alcoholic Beverages Businesses	14.7%
Oceania Integrated Beverages Business	17.1%
Pharmaceuticals and Bio-chemicals Businesses	17.6%
Other Businesses	15.2%

Operating profit



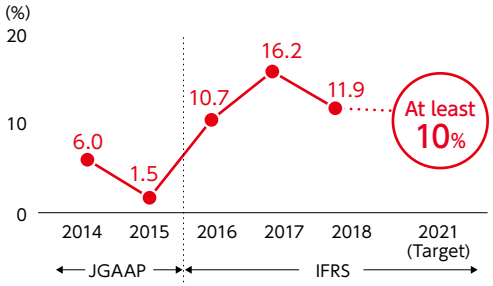
Japan Beer and Spirits Businesses	35.1%
Japan Non-alcoholic Beverages Businesses	9.9%
Oceania Integrated Beverages Business	22.0%
Pharmaceuticals and Bio-chemicals Businesses	25.0%
Other Businesses	8.1%

* The breakdown of operating profit by segment was calculated before management fee deductions equivalent to an amount excluding company-wide expenses and intersegment eliminations (amounting to approximately ¥36.3 billion).

Financial Highlights

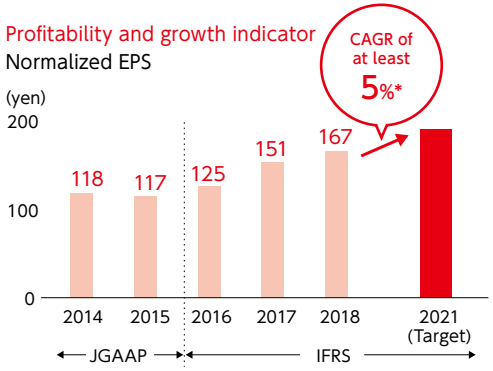
Capital efficiency indicator

Return on invested capital (ROIC)



Profitability and growth indicator

Normalized EPS



* The target is averaged over a three-year period

Notes
- Results prior to fiscal 2015 exclude amortization of goodwill
- ROIC = Earnings before interest and after tax /(Average interest bearing debt between the beginning and the end of the FY + average total equity between the beginning and the end of the FY)
- FY2018 ROIC is 9.4% if calculated excluding transient impacts such as income from sale of assets, etc.

Japan Beer and Spirits Businesses	Kirin Brewery, Other
Japan Non-alcoholic Beverages Businesses	Kirin Beverage, Other
Oceania Integrated Beverages Business	Lion
Pharmaceuticals and Bio-chemicals Businesses	Kyowa Kirin, Other
Other Businesses	Mercian, Myanmar Brewery, Other

Message from the Director in Charge of CSV Strategy

Senior Executive Officer Kirin Holdings Company,Limited

Ryosuke Mizouchi

In 2018, the Kirin Group's business activities were greatly impacted by a range of environmental issues, such as the torrential rains in Western Japan and the problem of ocean plastics. The environmental issues envisioned in the Long-Term Environmental Vision and the CSV Commitment are no longer risks that are far off into the future. There is now a real sense that they have already become present-day challenges.

Due to the localized torrential rains in Western Japan, rail networks were disrupted, highlighting the risks in the modal shift we have been pursuing to mitigate environmental burden and address the shortage of drivers. With the cooperation of the logistics and sales divisions, we were able to minimize the impact of this disruption. We also prepared and implemented a manual in 2018 that details responses to be taken in the event of future failures in function of modal shift.

Regarding the problem of ocean plastics, in February 2019, we announced the Kirin Group Plastic Policy. The main pillar of this Policy is our goal to use recycled plastic for 50% of the Group's PET plastic use in Japan by 2027, leveraging our track record in the commercial application of PET bottle beverages using recycled PET plastic. We have since commenced initiatives to achieve this target.

Based on these experiences, as part of our approach to the TCFD recommendation, the Group CSV Committee met in June 2019 with the President of Kirin Holdings as Committee Chair and the Kirin Holdings directors and Group company presidents as members, and began discussions on transition strategies based on environmental risk scenarios.

On February 14, 2019, our long-term management vision, Kirin Group Vision 2027 (KV2027) and the guidelines for the Vision's long-term and non-financial targets, Kirin Group CSV Purpose (CSV Purpose), were announced, and the 2017 CSV Commitment was updated.

Regarding the environment, we have renewed the position of our key performance indicators as non-financial targets in the 2019 Medium-Term Business Plan, and firmly integrated those indicators in our business strategies.

Resolving social issues through business will not only contribute to the United Nations' Sustainable Development Goals (SDGs). It is also the source of growth for Kirin's business.

For example, ecological surveys of vineyards for Japan Wine revealed that fields where grasses have been cultivated serve as grasslands that nurture diverse living creatures, including some rare species. As well as producing greater profits, the growth of Japan Wine industry will help to restore Japan's traditional rural Satochi-Satoyama landscapes by converting idle and devastated land into vineyards.

In our support for tea estates in Sri Lanka to obtain sustainability certification, we have expanded that support to small farms and engaged in our activities to conserve farm water sources. Following on from these efforts, we have also started assisting in the development of technologies to achieve pesticide-free farming and to increase yields. These are some of the ways in which we are contributing to the protection of the natural environment in farmlands and to the stable supply and improved quality of black tea leaves.

In action on global warming, we are pursuing initiatives to achieve science-based targets (SBT) for the reduction of GHG emissions to hold the increase in the global average temperature in line with 2℃ above pre-industrial era levels, which we set in 2017. In Japan, we have launched a plan to introduce heat-pump systems in all of our beer breweries. At Myanmar Brewery, we have taken advantage of the Joint Crediting Mechanism (JCM), a bilateral credit creation scheme being promoted by the Japanese government to introduce state-of-the-art brewing equipment that incorporates energy-saving technologies cultivated in Japan. These initiatives will also lead to costs reductions as well as reducing GHG emissions.

To achieve our CSV Purpose, the Kirin Group will use our strengths to contribute to solutions to environmental issues, while at the same time making our businesses more resilient and realizing sustainable growth.

CSV Purpose

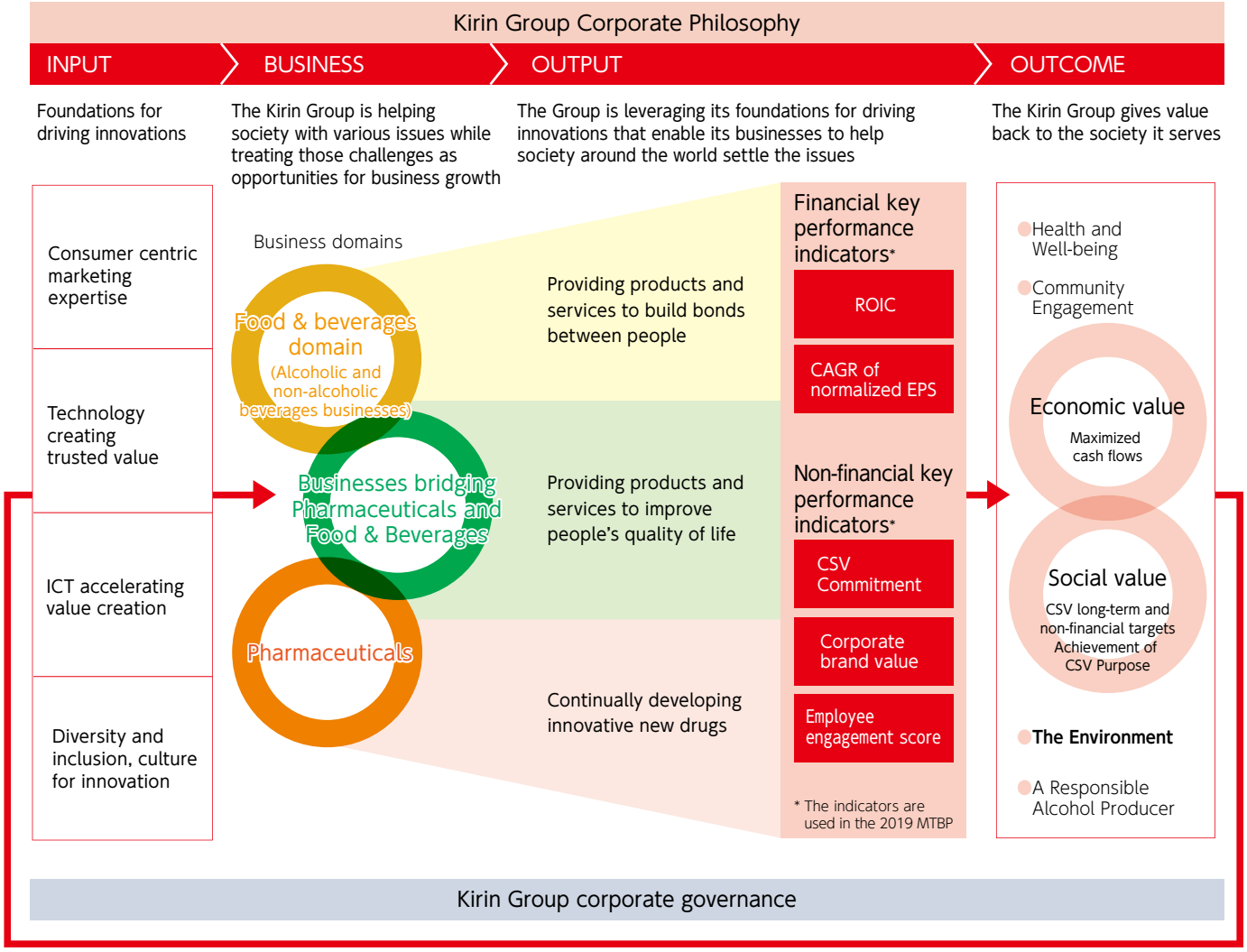
Joy brings us together
KIRIN

Health and Well-being
Raise the number of healthy people, lower the number of sick people, and contribute to the people who are involved in the healthcare

Community Engagement
Create more opportunities for customers to spend time with their families and friends, and develop the communities within our supply chain

The Environment
Realize a society based on 100% resource circulation by 2050

Responsible Alcohol Producer
Make steady progress toward eradicating the harmful use of alcohol in all countries of operation (Zero Harmful Drinking)



Details can be found in the KIRIN CSV REPORT 2019.
https://www.kirinholdings.co.jp/english/ir/library/integrated/2019

Kirin Group Long-Term Environmental Vision

Many people want to leave a beautiful earth to their children's generation. Kirin feels the same way. Kirin's beverages are made with agricultural produce and water, poured into containers, and delivered to consumers, but the global warming caused by the CO_2 generated in those processes have an impact on that agricultural produce and water. Our business is truly underpinned by the blessings of nature.
In order that we may pass this beautiful earth onto our children's generation and continue to deliver beverages to consumers, we aim to use the important raw materials of biological resources, water resources, and containers and packaging in sustainable ways, as well as to halve the carbon emissions generated from our business by 2050 so as to respond to global warming. Through these activities, we aim to balance the environmental burden of our business with the earth's capacity to cope with it in 2050.

Kirin Group Long-Term Environmental Vision

The Kirin Group shares with all the people associated with its value chain
its aspiration to continue to enjoy the bounty of nature and pass it down to the generations to come.

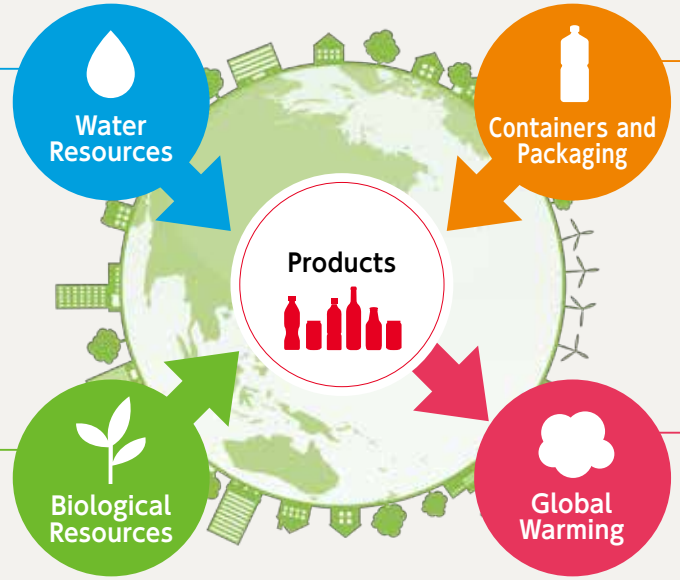
■Our direction：Realization of society that is based on 100% recycling

The Kirin Group will use resources in a cyclical manner, so as to keep their use at or below the level that the Earth can replenish them, while reducing the environmental loads that the Kirin Group generates through its value chain.

■Our efforts

We will share responsibilities in the implementation of activities, working in cooperation with non-governmental organizations and industry groups, maintaining close communication with a wide range of stakeholders.

Our 2050 Targets and related Risks and Opportunities



Water Resources

We make sustainable use of water togethere with our communities.

Attainment target: Strive to see that water resources in each region can be ensured on a permanent basis by 2050

Risks: Securing stable supplies of quality water, increased costs for water usage, impacts of disasters on production

Opportunities: Advanced water-saving technologies, progress with methods for tracking risks in catchment areas and along the value chain

Biological Resources

We support agricultual communities and make sustainable use of biological resouces.

Attainment target: Work toward sustainable use of biological resources by 2050.

Risks: Loss of producer communities, securing stable supplies of raw materials, regulatory risk, reputational risk

Opportunities: Establishment of good relationships with producers, securing high-quality raw materials with consideration for nature

Containers and Packaging

We use sustainable containers and pakaging in consideration of their users.

Attainment target: Work toward sustainable use of packaging and containers by 2050

Risks: Resource scarcity, raw material cost increases, CO_2 emissions from products life cycle, regulatory risk

Opportunities: Advanced technologies and R&D competence for packaging and containers, reduction of raw material usage, reductions in CO_2 emissions, cost reductions

Global Warming

We keep the CO_2 emissions of the value chain within the Earth's natural CO_2 absorption ability in cooperation with all the people associated with our value chain.

Attainment target: Keep CO_2 emissions across our value chain within the Earth' s capacity to absorb them by 2050

Risks: Impact of climate change on the business on the whole, rising energy costs, regulatory risk

Opportunities: Advanced energy-saving technologies, renewable energy, cost reductions

CSV Commitment

Our CSV Commitment was formulated alongside the identification of four key social issues, including the environment, that affect the Group. It sets out 19 commitments that clarify the medium to long-term action plan we should work on through our business. Five of them are related to the environment and have target years between 2020 and 2030 to meet our Long-Term Environmental Vision. Five other commitments related to community engagement will also contribute to solve issues related to the environment. The entire Group will strive to raise the effectiveness of CSV and actively disclose information about its outcomes.

Realize a society based on 100% resource circulation by 2050*

As a company that benefits from the many blessings of nature, including water and agricultural products, we recognize that the sustainability of the global environment is essential to ensuring the continuity of our business. By reducing the environmental burden in our value chain through such means as creating eco-friendly containers and packaging and addressing the issue of global warming, we are able to strengthen our business foundation. Under the Kirin Group Long-Term Environmental Vision, introduced in 2013, we aim to realize a society based on 100% resource circulation by 2050.

Kirin Group Long-Term Enviromental Vision	SDGs Target	Our Commitment	Our Approach	Our Achinvement	Goals for 2021
We support agricultual communities and make sustainable use of biological resouces. Attainment target: Work toward sustainable use of biological resources by 2050.	Target 15.4 Target 17.16 Target 17.17	3.3 Actions regarding biological resources We will protect the natural environment and preserve the ecosystems surrounding our business sites as well as areas producing raw materials.	●We will promote our efforts related to biological resources at major material production sites. ●We will strive to secure resources that may lead to deforestation in a sustainable manner.	①Use of FSC-certified paper or recyled paper for office paper ②Use of FSC-certified paper for paper containers and packaging*1 ③Actions regarding sustainable palm oil KH KB KBC ME	①100% (in 2020) ②100% (in 2020) ③100%*2
	Target 2.4 Target 12.3 Target 17.16 Target 17.17	3.5 Reduction of food waste We will reduce the amount of product waste generated stemming from factory shipment to delivery to our partners.	●We will reduce inventory excess (which leads to waste) through more accurate supply and demand predictions. ●We will reduce product waste by implementing thorough quality control.	Rate of product waste reduction KB KBC ME	75% (in 2025, compared with 2015)
We make sustainable use of water togethere with our communities. Attainment target: Strive to see that water resources in each region can be ensured on a permanent basis by 2050.	Target 3.9 Target 6.4 Target 17.16 Target 17.17	3.2 Actions regarding water resources We will reduce water use in production activities and continuously preserve water sources.	●We will promote water saving at our plants. ●We will investigate major hydrographic vulnerabilities at our production sites. ●We will continue to conserve water sources at our production sites.	①Water consumption reduction rate in 2020 ②Amount of water use in 2030 MBL KKC	**MBL** ①25% (in 2020, compared with 2015) **KKC** ② 30% (in 2030, compared with 2015)
We use sustainable containers and pakaging in consideration of their users. Attainment target: Work toward sustainable use of packaging and containers by 2050.	Target 12.2 Target 12.4 Target 14.1 Target 17.16 Target 17.17	3.4 Actions regarding containers and packaging We will continue to reduce the weight of containers and packaging while relying less on non-renewable resources and increasing the sustainability of materials.	●We will strive to maintain the 3Rs and resource circulation for containers and packaging. ●We will increase use of sustainable materials for our containers. ●We will introduce Life Cycle Assessment (LCA) and select container raw materials at an early stage of container / product development.	①Conversion rate of PET bottle resin to recycled resin ②Recyclability of container material ③Recycled material ratio for containers and packaging materials KB KBC ME LN	**KBC KB ME** ① 50% (in 2027) **LION** ②Over 90% (in 2030) ③Over 50% (in 2030)
We keep the CO_2 emissions of the value chain within the Earth's natural CO_2 absorption ability in cooperation with all the people associated with our value chain. Attainment target: Keep CO_2 emissions across our value chain within the Earth's capacity to absorb them by 2050.	Target 7.2 Target 13.1 Target 17.16 Target 17.17	3.1 Actions regarding climate change We will work to further reduce Green house gas (GHG) emissions through various initiatives, including the introduction of renewable energy.	●We will promote the introduction of renewable energy. ●We will promote energy conservation.	①Renewable energy ratio for plant purchased electric power ②Install solar power generation facilities ③Reduction ratio of GHG emission (Scope 1 and 2) ④Reduction ratio of GHG emission (Scope 3) KG	**KB** ①50% (in 2030) **LION** ②10MW (in 2026) **KG** ③30% (in 2030, compared with 2015) ④30% (in 2030, compared with 2015)

KG Kirin Group
KH Kirin
KB Kirin Brewery
KBC Kirin Beverage
ME Mercian
KKC Kyowa Kirin
LN Lion
MBL Myanmar Brewery

*1 6-can packs, gift boxes, drink boxes, cardboard cartons for products
*2 Using Book and Claim model, which is a model for the trading of certificates approved by the Round Table of Sustainable Palm Oil

Key CSV Issues

Community Engagement

Our Commitment

2.2.a We will work on improving the quality and stable procurement of Japanese hops and brew unique beers that can only be made with them while contributing to the revitalization of key producing areas.
2.2.b We will drive development of Japanese wines to ensure their global recognition and contribute to revitalizing key producing areas and local communities, which are the foundations of growing grapes and making wines.
2.2.c We will create highly sustainable conditions for procuring Myanmar rice for brewing while fulfilling our social responsibilities to the region.
2.2.d We will support Sri Lankan black tea farmers through such long-term initiatives as facilitating the acquisition of Rainforest Alliance certification, and expand the use of certified tea leaves.
2.2.e We will develop long-term, sustainable mutually beneficial partnerships with our raw material and packaging suppliers , which build a favorable demand for our product and ensure sustainable returns and the creation of value through the supply chain.

Identification of Materialities

For the identification of environment-related materialities (important issues), we extract a variety of issues, considering the state of the natural capital, local communities and global environment, all of which are essential to the businesses of the Kirin Group, and taking into consideration trends in debate in Japan and abroad, and the perspectives of our diverse stakeholders. The executives then discuss these issues, identify the priority issues that impact on the sustainability of society and on the Group's business, and incorporate them into our business plans.

Materialities Decision-Making Process

STEP 1 Extraction of relevant issues	Considers the circumstances surrounding the Kirin Group and extracts the relevant issues, referring to international standards and trends in domestic and international debate.
STEP 2 Confirmation of appropriateness	Consults extensively with various stakeholders, including external experts and NGOs, reflecting their views in internal discussions within Kirin.
STEP 3 Identification of Materialities	Holds discussions at the executive management level, determines risks and opportunities for business and society, and develops an action plan, which includes target indicators.
STEP 4 Ongoing Review	Ongoing consideration of the need for review of the materialities, reflecting the constantly changing state of social and environmental issues and the Kirin Group's circumstances.

Ascertaining risks and opportunities

Determination of environmental materialities

Integration with Group CSV Strategy (Determination of Group materialities)

Consideration of the environmental needs of 2050

The Kirin Group has three core businesses: alcoholic beverages; non-alcoholic beverages; and pharmaceuticals and bio-chemicals. All of these products are made with the blessings of nature. These businesses are built directly on the blessings of natural capital. In 2050, the global population is forecast to increase greatly from the current 7.6 billion to 9.8 billion. This has the potential to wreak major harm on natural capital. We determined that, for the sake of a sustainable society and business, we needed to respond to these kinds of long-term risks.

Identification of key environmental issues through dialogue and discussions

Through wide-ranging dialogue with external experts, NGOs and other diverse stakeholders of the Kirin Group, as well as discussions with the Kirin Group operating companies and the executives, we identified and considered the risks and opportunities for our business and society. Based on this, we identified biological resources, water resources, containers and packaging, and global warming as the most important environmental issues. At the Management Meeting in 2012, we established our Long-Term Environmental Vision, the ideal image for the year 2050.

Integration into the Long-Term Business Plan

In our Long-Term Business Plan, New KV2021, in addition to the creation of value that will meet our customers' expectations, we positioned the creation of value by addressing social issues as a new opportunity for growth, and revealed our 2021 Vision and our Strategic Framework for Value Creation. We also defined "technical expertise" as a strength of the Kirin Group. Through our core businesses of alcoholic beverage, non-alcoholic beverages, and pharmaceuticals and bio-chemicals, while leveraging the Group's strength of technical expertise across the Group, we aim to balance solutions to social issues with the provision of value to consumes and realize the creation of both economic and social value. Through this, the Kirin Group's own unique CSV, we aim to achieve sustainable growth together with society.

Positioning the CSV commitment targets as non-financial targets in the Medium-Term Business Plan

2050 Toward the Realization of Our Long-Term Environmental Vision

Consideration of management issues for sustainable growth

We have identified the management issues for sustainable growth, mapped out their impact on social sustainability and on the Group's business, and organized them into a Group Materiality Matrix. In February 2017, the Group CSV Committee decided on an order of priority to the issues within that Matrix, after taking into consideration the various guidelines and the perspectives of our stakeholders. We established that our responsibility as an alcoholic beverages manufacturer, health and well-being, community engagement, and environment as our CSV Priority Issues. For the environment, targets to be achieved in the medium term were set for the four themes of the Long-Term Environmental Vision.

Establishment of CSV Purpose

In February 2019, the Kirin Group established the long-term management vision, the Kirin Group Vision 2027 (KV2027), which calls upon the Group to become a global leader in CSV by 2027 by creating value in domains ranging from food & beverages to pharmaceuticals. Having referenced the SDGs to set the targets and goals for the key issues selected in 2017, in the face of these social issues, we have established and released our CSV Purpose as KV2027's long-term and non-financial targets and as a guideline to create shared value with society and promote sustainable growth.
We have also repositioned the 19 CSV Commitments, which represent our medium to long-term action plan for our individual businesses to realize the CSV Purpose, as non-financial targets for the 2019-2021 Medium-Term Business Plan, and will strive to achieve those targets.

Integration into business strategies and business plans

The Kirin Group has incorporated initiatives designed to achieve its Long-Term Environmental Vision and CSV Commitment into its business strategies, and we aim to create both social and economic value (CSV).

Key environmental issues - strategies for addressing risks and opportunities

The risks and opportunities related to key environmental issues that are believed to affect the Kirin Group's business, and the strategies for addressing them are as follows. We have assumed short-term (within three years), medium-term (until 2030), and long-term (until 2050) periods in which these risks and opportunities will manifest.

	Key environmental and social issues	Major risks	Time period	Major opportunities	Time period
Biological Resources	● Contraction of agricultural production ● Expansion of idle and devastated land ● Environmental destruction and human rights problems caused by unsustainable agriculture ● Impact of climate change on agricultural production regions	● Procurement risks of Japan-grown key agricultural products by Japanese farmers ● Reputation risk caused by environmental destruction and human rights issues caused by unsustainable agriculture mainly in developing countries ● Procurement risks due to harvest depletion and decline in quality of key agricultural products as a result of climate change ● Regulatory risks	Short – medium Short – medium Medium – long Short – long	● Protection of the natural environment and community revitalization in agricultural production areas and stable procurement of key agricultural products ● Securing of agricultural products and improvement of reputation through support to sustainable farm certification ● Expectations of ethical consumption	Short – medium Short – long Short – long
Water Resources	● Increase of drought in areas of high water stress ● Securing of water resources for the region's residents ● Reduction of water stress in agricultural production regions	● Suspension of manufacture and decline in production efficiency due to water shortages, reputation decline caused by continuation of production ● Decline in efficiency of water use due to high-mix low-volume production ● Procurement risks due to reduced harvest yields and decline in quality caused by drought in agricultural production regions ● Regulatory risks	Short – long Short – medium medium – long Short – long	● Securing of water resources and continuation of good relationships with the local community through water source conservation activities ● Cost savings through water conservation ● Continued stable procurement of key agricultural products through assistance with action against water stress in production regions ● Expectations of ethical consumption	Short – long Short – long Short – long Short – long
Containers and Packaging	● Solutions to ocean plastics problem ● Containers and packaging that are easier to use and recycle ● Sustainable use of raw materials for containers and packaging	● Reputation risk to PET bottles ● Depletion and procurement risks of petroleum resources for PET bottle containers ● Loss of precious forests caused by pulp used for paper containers ● Regulatory risks	Short – long medium – long Short – long Short – long	● Cost reductions resulting from reducing weight of containers ● Sustainable use of containers and packaging ● Expectations of ethical consumption	Short Short – long Short – long
Global Warming	● Curbing of global warming ● Reduction of impacts of climate change	● Criticism of failure to reduce GHG emissions and decline in investor evaluations ● Skyrocketing of energy costs ● Physical risks such as failure of modal shift to function due to climate change ● Regulatory risks	Short – long Short – long Short – long Short – long	● Cost savings through reduction of energy use ● Cost savings through reduction of GHG emissions and introduction of renewable energies ● Reduction of physical damage caused by climate change	Short – long Short – long Short – long

Biological Resources

In the short term, envisaged risks and opportunities include the opportunity for expansion of the craft beer market and Japan-grown hops procurement risk, opportunities for expansion of the Japan Wine market and improvement of biodiversity in the vineyards, and procurement risk for tea leaves imported from regions on which Kirin depends heavily for its ingredients. With the remarkable growth in the craft beer market of recent years, there has been a renewed recognition of the importance of Japan-grown hops as a key feature of such beers. However, due to aging and other factors, the number of hops farmers is now less than a quarter of what it was at its peak. In addition to fulfilling our responsibility as the purchaser of 70% of Japan's hops harvest, the Kirin Group also sees this as an opportunity. As a strategy for the revitalization of various production regions, we are conducting living species surveys in the hops fields of Tono. With the expansion of the Japan Wine market, Mercian has a plan to increase its production capacity of Japan Wine to 1.5 times its current level by 2027. Because this will require converting idle and devastated land into new vineyards, it is conducting ecological surveys jointly with National Agriculture and Food Research Organization (NARO) to determine the impact of that conversion. As a result, we have learned that vineyards cultivated in hedgerow style, with grasses grown in the vineyard, play a role as good-quality grasslands, creating rich ecosystems. This means that increasing the number of vineyards will contribute to the creation of Japan's traditional Satochi-Satoyama landscapes, which support biodiversity. Biological resources have the potential to lead to regulatory risk and reputational risk, and it is important to respond to the environmental and human rights issues caused by agriculture. The Kirin Group conducted a biological resources risk survey around 2012, based on which it formulated action plans for appropriate action on paper and palm oil, due to their high risks. Today, the Group has switched completely to FSC® certified paper and RSPO-certified palm oil for almost all of its requirements. Also, given the high dependence on Sri Lanka for the black tea leaves used to make Kirin Gogo-no-Kocha, which has been a top brand in Japan since it was first launched more than 30 years ago, we began helping Sri Lanka's tea farmers to obtain certification under the Rainforest Alliance (RA) sustainable farming certification scheme.

Over the medium term, in addition to these issues, we believe there to be physical risks to agricultural production regions due to climate change. The effects of climate change are already becoming a reality, with some tea farms in Sri Lanka continuing to suffer damage from drought or localized torrential rain. As a way to adapt to these circumstances, in 2018, we began assisting small tea farms, as well as the larger estates, to obtain RA certification, with the goal of having 10,000 small farms certified by 2025. In the course of the certification process, these small farms can learn something like how to prevent their soil from washing away in heavy rains.

In the long term as well, we envisage major physical risks of climate change to ingredient agricultural products. The Kirin Group has conducted surveys to identify the impact of climate change over the medium to long term on yields of our main ingredient agricultural products, including barley, hops, grapes, and black tea leaves, as well as the water risks in agricultural production regions. In terms of barley and hops, we found that the impact would be great in southern Europe and Australia. However, there are variations in the degree of impact, with yields predicted to increase in some countries and regions. There is potential to leverage the Kirin Group's procurement know-how, technological capabilities, and experience assisting with sustainability certifications to deal with those impacts, so we have launched strategies for those risks and opportunities. Going forward, we will assess and review those strategies using scenario analysis and other methods, and incorporate the outcomes in the Long-Term Environmental Vision, which is scheduled for revision this fiscal year.

Water Resources

In the short term, water stress in Australia is a challenge, but we believe the impact will be more moderate in other regions. Surveys of the water risk to manufacturing sites conducted in Australia in 2014 and 2017 had envisaged a high risk, and more recently, some areas are facing continued severe drought. Leveraging its experience of past droughts, Lion has realized an industrial water consumption rate of 3.22 m3/kL, which is the highest level of water saving in the Group. Severe drought could potentially lead to stringent water restriction risk and reputational risk, so initiatives in this area will need to be ongoing. Our surveys have found that water stress is not great in other regions, but we continue to pursue initiatives to reduce water use for the cleaning of tanks and pipes in the manufacturing process. For example, in 2018, Kirin Breweries reduced its total industrial water use by 66% compared to 1990 levels, and halved its water consumption rate. Myanmar Brewery has set a target of reducing water consumption rate in 2020 by 25% compared to 2015 levels, and the Kyowa Kirin Entire Group (Global) has set a target of reducing water use in 2030 by 30% compared to 2015 levels. These two companies are currently engaged in water conservation initiatives to meet those targets. We continue to engage in activities to protect water sources, which we began in 1999, with initiatives underway in 12 locations throughout Japan.

Risks envisaged over the medium term include procurement risk resulting from water stress in ingredient production areas and the risk of a decline in water use efficiency due to high-mix low-volume production. At the tea farms in Sri Lanka, water sources known as micro-watersheds located on the farms were used as farming and grazing land, causing them to deteriorate in quality. To protect these precious sources of water, in 2018, we launched water source conservation initiatives with the cooperation of local NGOs and the people involved on the tea farms. There is a risk that the increased frequency of switching between products that comes with high-mix low-volume production will cause a decline in water use efficiency. This makes it important to continue with water conservation activities.

Over the long term, we envisage procurement risks due to water stress in ingredient production areas. The Kirin Group has conducted surveys to identify the water risks over the medium to long term due to the climate change in agricultural production regions of our main ingredient agricultural products. Surveys have shown that there are regions in which we envisage large water stress over the medium to long term for all ingredients, and we have started deliberations on strategies for addressing the risks and opportunities they present. Going forward, we will assess and review those strategies using scenario analysis and other methods, and incorporate the outcomes

in the Long-Term Environmental Vision, which is scheduled for revision this fiscal year.

Containers and Packaging

Over the short term, there are reputational and regulatory risks presented by the ocean plastics problem and other issues, but we also envisage opportunities for reducing costs through weight reductions. Ocean plastics has been set as an important management issue, and we are pursuing initiatives based on the Kirin Group Plastics Policy, which we established in February 2019. This Policy calls for 50% of PET plastics used in Japan to come from recycled plastic by 2027. Recycled PET plastic is already being used for the "Kirin Gogo-no-Kocha Oishii Muto (sugar-free) 500 mL PET Bottle" black tea beverage, and since May 2019, it is also being used on 100% for "Kirin Nama-cha Decaf 430 mL PET Bottle" green tea beverage production. There are ever growing societal expectations for containers and packaging that are lighter and easier to use and recycle. Leveraging the advantage it has in the Research Laboratories for Packaging Technologies, which makes the Kirin Group one of the few alcoholic and non-alcoholic beverage manufacturers in Japan to develop containers and packaging in-house, the Kirin Group has developed and commercialized Japan's lightest returnable beer bottles, aluminum cans, and 2.0-liter PET bottle. These initiatives have helped us to reduce our manufacturing and transport carbon footprints, and to mitigate environmental burden and reduce costs through reductions in the volumes of resources used. We can expect to distinguish ourselves from our competitors through R&D in the area of containers and packaging in the future as well. In our non-alcoholic beverages business, we use large volumes of paper containers for transport. The sustainable use of those containers is an important challenge. We established an Action Plan and launched actions in 2013. In 2017, we declared that we would switch to FSC®-certified paper for all 6-can packs, gift boxes, drink boxes, and product cardboard boxes by 2020 for Japanese alcoholic and non-alcoholic beverages businesses. We have already switched to FSC-certified paper for almost all paper containers.

In the medium term, the plastics problem will continue to be a major challenge, and we also expect to see opportunities for capturing markets through ethical consumption. In the area of responses to the ocean plastics problem, we will draw up a roadmap for realizing the Kirin Group Plastics Policy. For action on paper containers, the Kirin Group is pursuing initiatives, but social awareness of this issue is not very high, and the problem of forest destruction itself has not been resolved. For this reason, working with international NGOs and other agencies, we have launched activities to increase awareness about FSC certification and the issues behind it in Japan.

Our challenge over the long term will be securing the requisite volume of recycled PET of the requisite quality towards the realization of the Kirin Group Plastics Policy. As it is difficult for a single company to achieve, we are pursuing initiatives toward action that transcends corporate boundaries, maintaining contact with diverse stakeholders. Going forward, we will continue to assess and review those strategies using scenario analysis and other methods, and incorporate the outcomes in the Long-Term Environmental Vision, which is scheduled for revision this fiscal year.

Global Warming

In the short term, there are opportunities for cost reductions through reductions of energy consumption, and physical risks due to climate change are also apparent. As early as 2009, the Kirin Group set a target of reducing CO_2 emissions across its entire value chain to half of 1990 levels by 2050, and has been working toward that goal. It was one of the first companies in Japan to calculate and publicize its Scope 3 emissions targets. As the result of various initiatives, at Kirin Brewery, for example, combined Scope 1 and Scope 2 emissions in 2018 were reduced by 67% compared to 1990 levels. GHG emissions across the Group's entire value chain have also been reduced by 30% compared to 1990 levels. On the other hand, in 2018, localized torrential rain, believed to be caused by climate change, caused the disruption of railway networks, reconfirming the physical risks of climate change. In addition to keeping the impact of this incident to a minimum, we have formulated and begun implementing measures for taking immediate action in the event of a similar crisis in the future.

In the medium term, we envisage further regulatory risks concerning GHG emissions, as well as opportunities for leveraging those regulations to improve energy efficiency. In 2017, the Kirin Group set and publicized medium-term targets for GHG emission reduction of a 30% reduction compared to 2015 levels for combined Scope 1 and Scope 2 emissions, and the same 30% reduction for Scope 3 emissions by 2030. These were the first targets of a Japanese food and beverage manufacturer to be approved by the international Science Based Targets (SBT) initiative as targets for the reduction of GHG emissions based on scientific grounds to hold global average temperature rises to below 2°C over pre-industrial levels. We are now working on drawing up a concrete roadmap to meet these targets. As a first step, we are proceeding with plans to install heat-pump systems to all Kirin Brewery manufacturing plants. It is envisaged that this initiative will bring major improvements to energy efficiency as well as the shift in our energy use to electricity. This energy shift will also make it easier to use renewable energies in the future.

In the long term, it is envisaged that the impact of climate change, including regulatory, physical, and transition risk, will become increasingly serious. There is also a growing need for appropriate disclosure to investors of risks and opportunities. To that end, in December 2018, we became the first Japanese food company to endorse the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD). After a trial scenario analysis in 2018, a more detailed survey and analysis were conducted in 2019. The Group CSV Committee convened in June 2019, with the President of Kirin Holdings as Committee Chair, and the Kirin Holdings directors and Group company presidents as members, to begin discussions on transition and adaptation strategies based on environmental risk scenarios. In the scenario analysis, we studied and analyzed the impact that carbon pricing would have on energy costs in the medium to long term. Demands for businesses to reduce their GHG emissions are growing every year, and communities and businesses are moving quickly to respond to those demands. Going forward, we will continue to assess and review those strategies using scenario analysis and other methods, and incorporate the outcomes in the Long-Term Environmental Vision, which is scheduled for revision this fiscal year.

Scenario Analysis

Based on the recommendations released by the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board (FSB) in 2017, the Kirin Group assesses the potential impacts of climate change-related risks and opportunities to Kirin's businesses and the resilience of its environmental strategies defined in the Kirin Group Long-Term Environmental Vision and CSV Commitment.

In 2018, we used the IPCC's Representation Concentration Pathways (RCP) as the main pathways, supplemented by the IPCC's Shared Socioeconomic Pathways (SSP), to establish three Group Scenarios and analyzed the impact of climate change on agricultural products that are important ingredients for the Group's businesses. As a result, we determined anew the potential for climate change to have a major impact on agricultural products.

In 2019, we assessed the future impact of climate change on agricultural product yields, water risks such as flooding and water stress on agricultural regions that produce our ingredients, our Japanese production sites and logistics channels, and the impact of carbon pricing on the Kirin Group's carbon emission costs.

Regarding agricultural product yields, we studied more than 25 papers concerning barley, hops, wine grapes, and black tea leaves. Using Group Scenario 1 (2°C scenario, SSP1, sustainable development) and Group Scenario 3 (4°C scenario, SSP3, unwanted world) that were established in 2018, we analyzed the impact of climate change in the main individual supplier countries in 2050 and 2100.

Regarding water risk in agricultural production regions, targeting barley, hops, black tea leaves, wine grapes, coffee beans, and corn, we made the flooding risks and water stress in the main supplier regions visible on a map and investigated them.

Regarding water risk in manufacturing locations and logistics routes in Japan, we assessed the risk of flooding for four major products in beverage manufacturing locations, including outsourced manufacturers, and their logistics routes.

Regarding the impact of carbon pricing on the Kirin Group's carbon emission costs, we divided our assessment into the event that GHG emission reduction targets were met and the event that we did not engage in the reduction of emissions, for each of Group Scenario 1 and Group Scenario 3.

Agricultural product yields and water stress

In both Group Scenario 1 and Group Scenario 3, significant drops in yields were forecast for barley and hops. The assessment was also that water risks would rise considerably in agricultural production regions. Meanwhile, due to the lack of common models for estimating the impact of price fluctuations of agricultural products at this point in time, it is not easy to assess the financial risks.

Impact of climate change on major agricultural product yields/land suitable for cultivation

Legend: Negative/positive impact of less than 10% ▲/+
From 10% to less than 50% ▲▲/++
50% or more ▲▲▲/+++

Agricultural products	Kirin Group Scenario3: 4℃, unwanted world, 2050			
	United States	Asia	Europe/Africa	Oceania
Barley		West Asia Yield▲/+ South Korea Yield+	Finland Spring wheat yield▲ Mediterranean coast (West) yield▲, (East) yield+ France Winter barley and spring barley: Both yields▲	Western Australia Yield▲▲
Hops			Czech Republic Yield▲	
Black tea		Sri Lanka Yields down in lowlands Little impact of temperature rise in highlands India (Assam region) For each 1°C temperature rise above average temperature of 28°C, yields down 3.8% India (Darjeeling region) Yield▲▲~▲▲▲ (Sources from tea industry, not academic papers)	Kenya Rise in altitude of suitable cultivation land Major contraction of suitable cultivating land in Nandhi region and western Kenya Kenyan mountain regions will remain suitable for cultivation Malawi Chitipa district: Suitable land▲▲▲ Nkhata Bay district: Suitable land▲▲▲ Mulanje district: Suitable land+++ Thyolo district: Suitable land++	
Wine grapes	United States (California) Suitable land: ▲▲▲ Northwestern United States Suitable land: +++ Chile Suitable land: ▲▲	Japan (Hokkaido) Expansion of suitable land Enable cultivation of Pinot Noir Japan (Central Honshu) Suitable land expanded on the one hand, but high-temperature damage also caused	Northern Europe Suitable land: +++ Mediterranean coast Suitable land: ▲▲▲ Spain Production volumes▲to▲▲ Western Cape, South Africa Suitable land: ▲▲▲	New Zealand Suitable land: +++ Southern coastal regions of Australia Suitable land: ▲▲▲ Outside southern coastal regions of Australia Suitable land: ▲▲
Coffee beans	Brazil Suitable land for Arabica: ▲▲▲ Suitable land for Robusta: ▲▲▲	Southeast Asia Suitable land for Arabica: ▲▲▲ Suitable land for Robusta: ▲▲▲	East Africa Suitable land for Arabica: ▲▲ Suitable land for Robusta: ▲▲	
Corn	Southwestern United States Yield ▲▲ United States (Iowa in mid-West) Yield ▲~▲▲			

There is a large potential risk for future declines in yields of barley and hops, but it is also possible to mitigate that impact through our own knowledge and technology. The Kirin Group has developed advanced brewing technologies that do not rely on barley, such as happo-shu (low-malt beer) and new genres, and is able to use alternative sugars, so it is believed to be highly adaptable to those declines in yields. These technologies can be used in other countries and regions, which may give us an advantage in those regions. Also, in the event that agricultural products that can adapt to higher temperatures are developed, there is a possibility that the Kirin Group will be able to contribute to the speedy expansion of acreage planted with such crops, using its original plant propagation technologies.
The knowledge that we have acquired through our support of farms in Sri Lanka to obtain sustainability certification and our activities to conserve water sources on tea farms in that country could also be adapted for use on other crops if the need arose.

While significant barley yield declines are projected for southern Europe and Australia, it is projected that northern Europe and West Asia will see yield increases, and the impact is also expected to be minor in Japan. For black tea leaves, yield declines are projected for the lowlands of Sri Lanka and certain parts of Malawi, but no significant potential impact was recognized for Sri Lanka's highlands and for other production countries and regions. In this way, the degree to which climate change will have an impact on agricultural products varies greatly between countries and regions. Current initiatives and knowledge, which disperse the risks by procuring ingredients from multiple production regions to mitigate the impacts of drought and market conditions, could be used in medium to long-term responses to climate change.

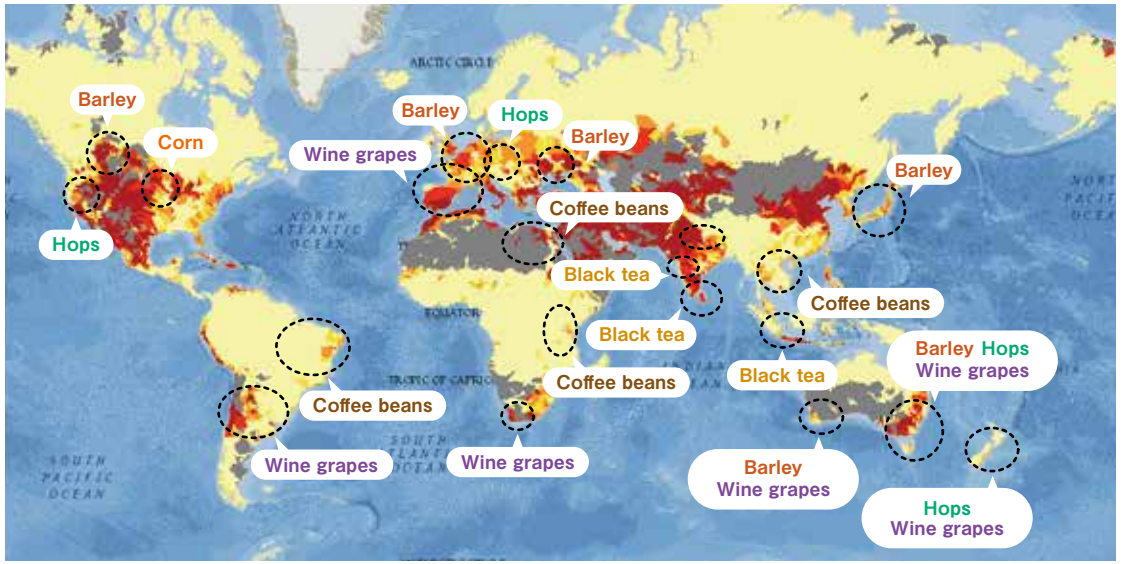
Water risk in manufacturing locations and logistics routes

We were able to identify that some of our production bases for the non-alcoholic beverages covered by the survey were located in places with high risk of flooding. Kirin Beverage suffered from the disruption of their logistics channels, including rail networks, due to the torrential rain in western Japan in 2018. As well as taking action to minimize the impact of this, it has also prepared a manual for action in the event of a similar disaster. This experience of responding to the disaster in the short term and re-working systems in preparation of disasters that could occur in the future may prove effective in the event of a similar occurrences.

Carbon Pricing

In Group Scenario 1 (2°C scenario, SSP1, sustainable development), it was determined that achieving the 2030 GHG emission reduction targets would save approximately 4.7 billion yen in annual carbon emission costs compared to not taking action to reduce emissions. This is due to the effectiveness of the Kirin Group's high GHG reduction targets, which were the

Water stress in major agricultural production regions (2040, equivalent to Kirin Group Scenario 3)



source : World Resources Institute

Assessment of impact of carbon pricing

In event of inaction on medium-term GHG emission reduction target of 30% by 2030

Kirin Group Scenario1:2℃, sustainable deveropment
Kirin Group Scenario1:4℃, unwanted world

	Kirin Group Scenario 3		Kirin Group Scenario 1	
	2025	2040	2025	2040
Estimate cost of impact (unit: 1,000 USD)	10,944	14,448	51,268	80,374
Estimate cost of impact (unit: 1 million JPY)	**1,215**	**1,604**	**5,691**	**8,921**

In event of achievement of medium-term GHG emission reduction target of 30% by 2030

	Kirin Group Scenario 3		Kirin Group Scenario 1	
	2025	2040	2025	2040
Estimate cost of impact (unit: 1,000 USD)	8,956	6,905	41,958	38,411
Estimate cost of impact (unit: 1 million JPY)	**994**	**766**	**4,657**	**4,264**

* Calculated by multiplying assumed CO_2 emissions in 2025/2040 by carbon price forecasts

first such targets established in Japan's food and beverages industry as reduction targets based on scientific grounds, to keep temperature rises to less than 2°C from pre-industrial levels, according to the Science Based Targets (SBT) initiative. However, we must take into account the fact that carbon pricing is influenced by the policies of individual countries, which makes accurate predictions difficult.

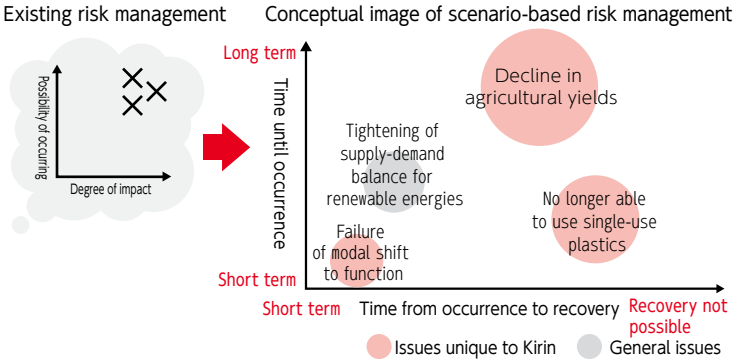
Future steps

These analysis results have reaffirmed that we are not mistaken in the vision we are aiming for, our targets, and the directions of our initiatives in the Kirin Group Long-Term Environmental Vision and the CSV Commitment. We also confirmed a certain level of resilience in the Kirin Group's environmental strategies at this point in time.

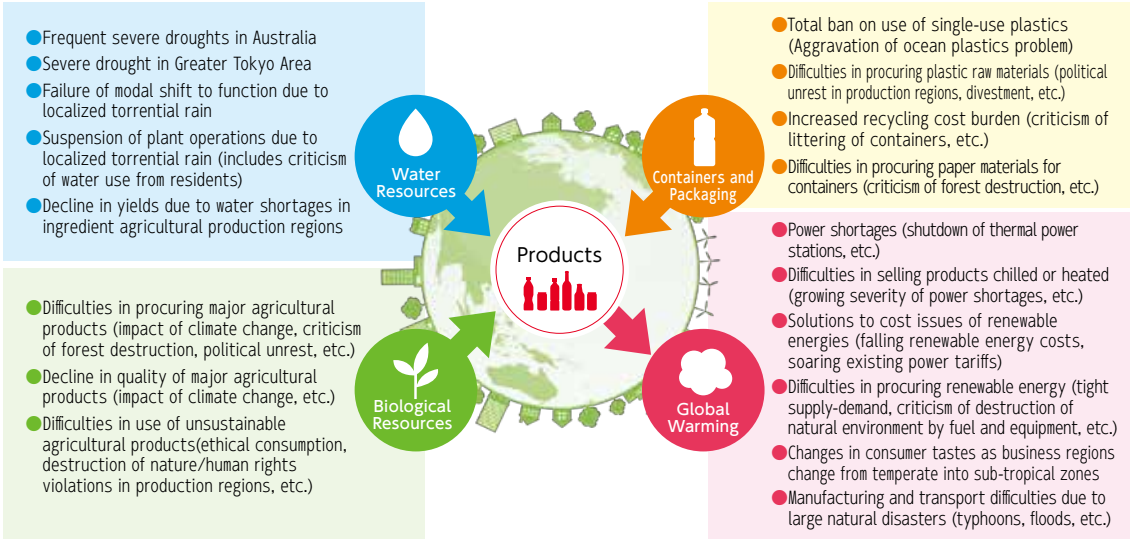
However, the conclusions drawn in the literature regarding the impact of climate change on agricultural products, which formed the basis of our assessments, varied greatly, and the precision of the water risk assessments could not be described as high. With the physical crisis in the form of the disruption of railway transport, the leading form of modal shift, becoming a reality, community concerns about the natural environment and the expectations placed on businesses are predicted to increase even further.

To respond to them, we need to review the entire value chain and raise the resilience of our strategies. To this end, leveraging the findings of these recent analyses, we plan to revise the Kirin Group Long-Term Environmental Vision within the current fiscal year. In addition to accelerating the initiatives that are already underway, we will set higher targets and medium to long-term challenges for achieving them, and formulate roadmaps.

Regarding risks that would have an extremely significant impact if they were to eventuate, even though we may not know the chances of their eventuating, the establishment of new risk management systems that set scenarios and assess risks is a challenge. In the Group CSV Committee and other forums, the executive level will deepen their debate on the assessment of environmental risks based on those scenarios and adaptation strategies, with plans to steadily incorporate them into management strategies.



Examples of climate-related risks that will require consideration going forward



Examples of adaptation strategies in response to extracted medium and long-term risks

Category	Conceivable risk	Proposed response
Biological Resources	Extreme drop in yields of core agricultural products (barley, hops, black tea leaves, grapes, etc.) due to climate change makes them difficult to obtain	●Decentralization/changes in supplier countries/regions based on assumption of climate change impact ●Increased production of climate-resistant plant seeds and seedlings with Kirin's plant propagation technologies ●Use of happo-shu (low-malt beer) and new genre (limitations on use of barley, etc.) technologies
	Supplier farms face wave of criticism that they are destroying forests or violating human rights	●Expansion of assistance for farms to obtain sustainability certification, e.g. Rainforest Alliance certification
Water Resources	Water use in manufacturing plants becomes difficult due to severe water shortages and criticism of plants' water intake heightens	●Set further water conservation targets and work toward them ●Water source conservation activities
	Drought makes production of ingredients (barley, hops, black tea leaves, etc.) difficult	●Activities to preserve water sources in production regions ●Use Kirin' s plant propagation technologies to increase production of seeds and seedlings of plants that will grow with less water
	Plant operations are shut down due to flooding, making it impossible to supply product	●Change to concentration of manufacturing in one place, review of locations
Containers and Packaging	Ocean plastics problem becomes increasingly serious and plastic materials and containers/packaging can no longer be used	●Promotion of resource circulation of PET plastics ●Use of plant-derived plastics ●Shift to alternative materials such as paper, conserve plastic
	Criticism grows that forests are being destroyed for raw materials for paper containers	●Expand use of FSC-certified paper
Global Warming	Energy costs increase due to soaring fossil fuel prices	●Introduction of internal carbon pricing ●Expansion of renewable energies
	Unable to expand introduction of renewable energies due to excessive demand	●Early securing of renewable energies ●Commencement of in-house power generation with renewable energies
	Use of fossil fuels becomes difficult	●Promotion of total electrification of plant manufacturing processes ●Introduction of hydrogen fuel
	Global warming advances and consumers' tastes change	●Insight learning and application
	Transport networks are disrupted due to localized torrential rainfall	●Formulation of BCP, review of logistics networks

Key Targets of the Long-Term Environmental Vision and CSV Commitments

Water Resources

We make sustainable use of water togethere with our communities.

Amount of water use

2030 (compared to 2015)

30% reduction

Kyowa Kirin Group total (global)

Water consumption rate

2020 (compared to 2015)

25% reduction

Myanmar Brewery

Water source forestation initiatives

Continuation

Kirin Brewery | Kirin Beverage | Kirin Distillery | Kyowa Kirin Group

Containers and Packaging

We use sustainable containers and pakaging in consideration of their users.

Paper containers using FSC®-certified paper

2020

100%

Kirin Brewery | Kirin Beverage | Mercian

90% recyclability by 2030 Lion

50% recycled materials by 2030 Lion

Percentage of recycled plastics in PET bottles

2027

50%

Kirin Brewery | Kirin Beverage | Mercian

Biological Resources

We support agricultual communities and make sustainable use of biological resouces.

Sustainability of tea farms

2025

10,000 farms

Kirin Beverage

Number of small farms assisted to obtain Rainforest Alliance certification

Food waste

2025 (compared to 2015)

75% reduction

Kirin Brewery | Kirin Beverage | Mercian

Use of FSC-certified paper or recycled paper in offices

2020 100%

Kirin Brewery | Kirin Beverage | Mercian

Sustainable palm oil

Continuation of 100% Kirin Group-wide

Percentage of use of sustainable palm oil

Global Warming

We keep the CO_2 emissions of the value chain within the Earth's natural CO_2 absorption ability in cooperation with all the people associated with our value chain.

Greenhouse gases

2030 (compared to 2015)

30% reduction

Kirin Group-wide

Scope 1 + Scope 2 and Scope 3

2030 50%

Percentage of renewable energy in breweries' purchased power

Kirin Brewery

2026 10MW

Introduction of solar power generation facility Lion

CO_2 reductions across value chain

2050 (compared to 1990)

50% reduction Kirin Group-wide

Progress

Theme	Issues	Progress	Page
Biological Resources	Securing biodiversity in Japanese farming land	Expanded ecological surveys on vineyards for Japan Wine to beyond Mariko Vineyard. Began revegetation activities with participation of the general public, as well as employees. Continued living creature observation events at Tono hops fields.	→P.23,25,26
	Sustainable use of bio-resource materials	Continued support for large tea estates in Sri Lanka to obtain certification. Commenced support for small tea farms to obtain certification in 2018. Achieved 100% use of FSC®-certified paper for major paper containers and packaging. Achieved high rate of use of FSC-certified paper or recycled paper in offices. Continued 100% use of palm oil (primary and secondary materials) certified by RSPO's Book & Claim.	→P.23,24,27,43
	Reduction of food waste	Promoted "Year-Month" labeling of use-by dates in Japan. Promoted food bank in Australia. Established reduction targets for Japan (75% compared to 2015 in 2025).	→P.23,30,31
Water Resources	Promotion of water conservation activities	50% reduction in water consumption rate by Kirin Brewery (in 2018, compared to 1990). 8% reduction in water use for whole of Kyowa Kirin Group (global) (in 2018, compared to 2015). 25% reduction in water consumption rate by Myanmar Brewery (in 2018, compared to 2015). Use of water risk surveys in 44 global manufacturing locations in nine countries to scenario analysis.	→P.14,15,16,33,36,38,39
	Water source conservation activities	Continued water source conservation activities in 12 locations nationwide.	→P.33,35
	Conservation of water resources in production regions	Continued water resources conservation activities and education on Sri Lankan tea farms.	→P.33,34
Containers and Packaging	Expansion of use of sustainable raw materials for containers and packaging	Established Kirin Group Plastics Policy and maintained and expanded coastal clean-up activities. Launched sale of Nama-cha Decaf green tea beverage in PET bottles made with 100% recycled PET plastic. Percentage of recycled plastic in PET bottles in Japan: 2%. In paper containers, achieved 100% use of FSC-certified paper for beer 6-can packs, gift boxes, and product cardboard cartons, approximately 97% for drink boxes, and approximately 98% for beverage 6-can packs.	→P.41,42,43
	Promotion of 3R/resource circulation for containers and packaging	Achieved 28.3 grams 2.0-liter PET bottle for Alkali Ion Water, the lightest in Japan. Achieved PET bottles recycling rate of 84.8%, aluminum cans recycling rate of 92.5%, and stainless steel cans recycling rate of 93.4% in Japan (FY2017).	→P.41,46,47,52
Global Warming	Promotion of reduction of GHG emissions	Decided on introduction of heat-pump systems in all breweries in Japan. Began joint transport on beer pallets. Achieved 3.8% reduction in Scope 1 + Scope 2 GHG emissions (in 2018, compared to 2015). Achieved 10% reduction in Scope 3 GHG emissions (in 2018, compared to 2015).	→P.55,57,59,64,65
	Promotion of introduction of renewable energies	Achieved ratio of 29% for renewable energy in plants' purchased power by Kirin Brewery.	→P.55,62,63,92

External Evaluation

Kirin Holdings was recognized by CDP, an international non-profit organization that provides environmental information disclosure systems, as an "A-List" company for water security. This is the third consecutive year that we have received this score. We obtained an "A-" ranking in the "climate change" category. In 2019, we also obtained an "A" rating, the highest rating for the category, in the Supplier Engagement Ratings, and we were selected for the first time for the Supplier Engagement Rating Leader Board, recognizing us as a global leader in supply-chain climate change action.

CDP DISCLOSURE INSIGHT ACTION A LIST 2018 WATER SECURITY

CDP DISCLOSURE INSIGHT ACTION SUPPLIER ENGAGEMENT LEADER 2019

The Kirin Group conducts transparent disclosure of information to its investors and other stakeholders. As such, we have been selected for the following Socially Responsible Investment (SRI) indices.

FTSE Blossom Japan

FTSE4Good

Member of SNAM Sustainability Index 2018

MSCI MSCI Japan ESG Select Leaders Index

Greenification Awards

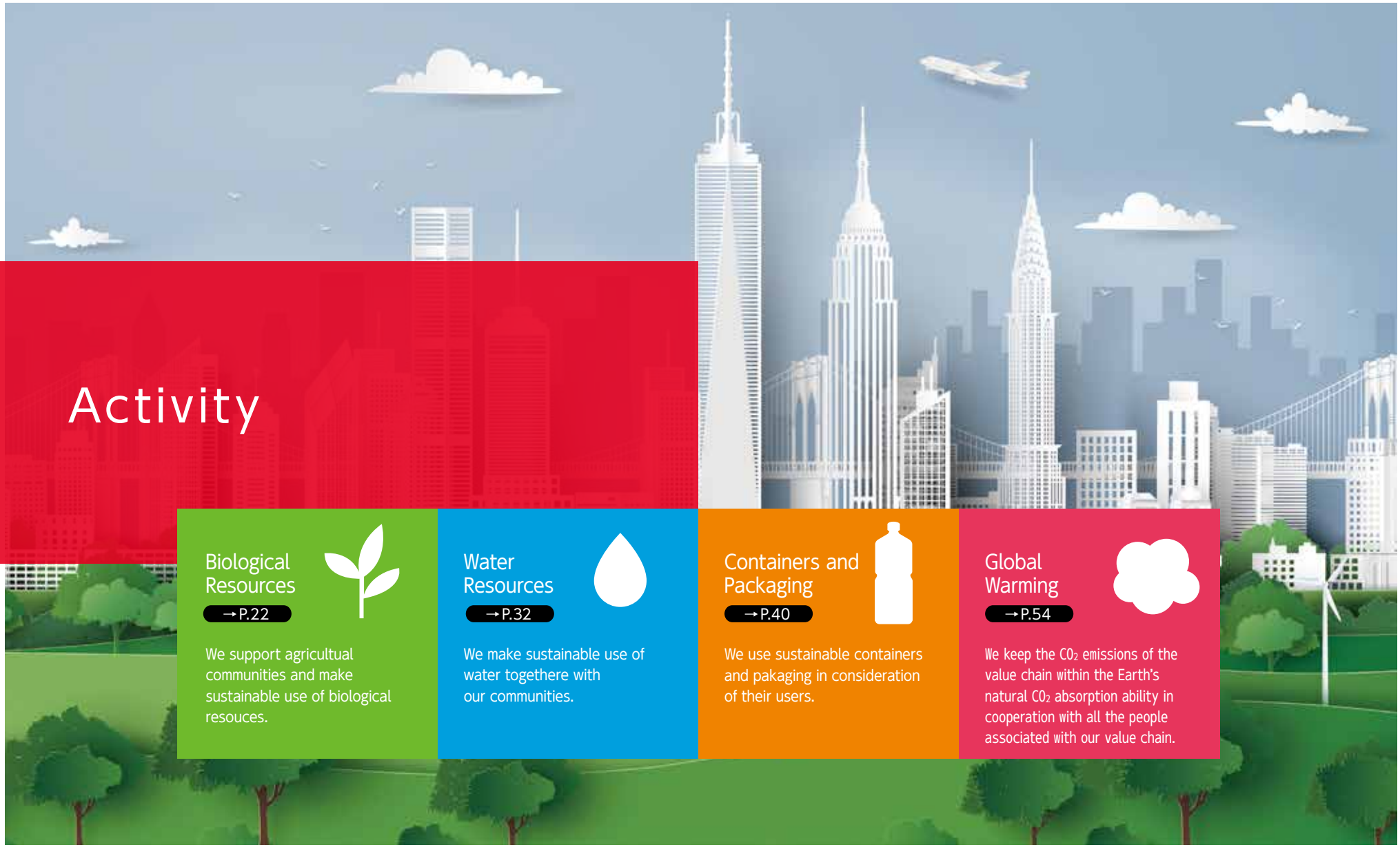
Kirin Brewery's Yokohama Brewery was awarded the Japan Greenery Research and Development Center Chairman's Prize, and its Kobe Brewery was awarded the Prime Minister's Prize for Persons of Merit in Greenification Promotion.

Environmental Report

The Kirin Group Environmental Report 2018 was awarded the Prize for Excellence in Environmental Reports (Global Environmental Forum Chairman's Award).

Packaging and Containers

Kirin Brewery's lightweight middle-sized (returnable) bottle, the lightest in Japan received a WorldStar Award in the Beverage Category of the WorldStar 2018 Packaging Awards, hosted by the World Packaging Organization (WPO), and the Function and Environment Award at the 14th Glass Bottles Awards. Our aluminum can, which is the lightest in Japan, won the 41st Kinoshita Prize, and our 2L PET bottle, also the lightest in Japan, was awarded the 40th Kinoshita Prize, WorldStar Award, and AsiaStar Award in 2016.



Activity

Biological Resources

→P.22

We support agricultual communities and make sustainable use of biological resouces.

Water Resources

→P.32

We make sustainable use of water togethere with our communities.

Containers and Packaging

→P.40

We use sustainable containers and pakaging in consideration of their users.

Global Warming

→P.54

We keep the CO_2 emissions of the value chain within the Earth's natural CO_2 absorption ability in cooperation with all the people associated with our value chain.

Performance·highlight

The aims of the Long-Term Environmental Vision are to contribute to the prevention of global warming by keeping greenhouse gases down to a level that can be absorbed by the earth as well as to use biological resources, water resources, and containers and packaging in sustainable ways. Most of the objective indicators of sustainability are still a work in progress, but as of the end of 2018, we have achieved or established the following sustainability-related targets.

Water Resources

We make sustainable use of water togethere with our communities.

Water consumption rate

50% reduction
Kirin Brewery
Rate of reduction of water consumption rate (compared to 1990)

25% reduction
Myanmar Brewery
Rate of reduction of water consumption rate (compared to 2015)

Amount of water use

8%reduction
Kyowa Kirin Group total (global)
Rate of reduction of amount of water use(compared to 2015)

Rate of use of recycled water

62%
Kirin group-wide
Rate of use of recycled water in Group-wide plants and business locations

Containers and Packaging

We use sustainable containers and pakaging in consideration of their users.

Paper containers using FSC®-certified paper

100%
Kirin Brewery | Kirin Beverage | Mercian
6-can packs, gift boxes and cardboard cartons for products

Percentage of recycled plastics in PET bottles

2%
Kirin Brewery | Kirin Beverage | Mercian

Biological Resources

We support agricultural communities and make sustainable use of biological resouces.

Sustainability of tea farms

120 farms
Kirin Beverage
Number of small farms assisted to obtain Rainforest Alliance certification

Food waste

66% reduction
Kirin Brewery | Kirin Beverage | Mercian
(FY2017 compared to 2015)

Use of FSC-certified paper or recycled paper in offices

96%
Kirin Brewery | Kirin Beverage | Mercian

Sustainable palm oil

100%
Kirin group-wide
Rate of sourcing of primary and secondary raw materials through RSPO's Book & Claim purchasing method

Global Warming

We keep the CO_2 emissions of the value chain within the Earth's natural CO_2 absorption ability in cooperation with all the people associated with our value chain.

Scope1+Scope2

3.8% reduction
Kirin group-wide
Rate of reduction of greenhouse gas emissions (compared to 2015)

Scope3

10% reduction
Kirin group-wide
Rate of reduction of greenhouse gas emissions (compared to 2015)

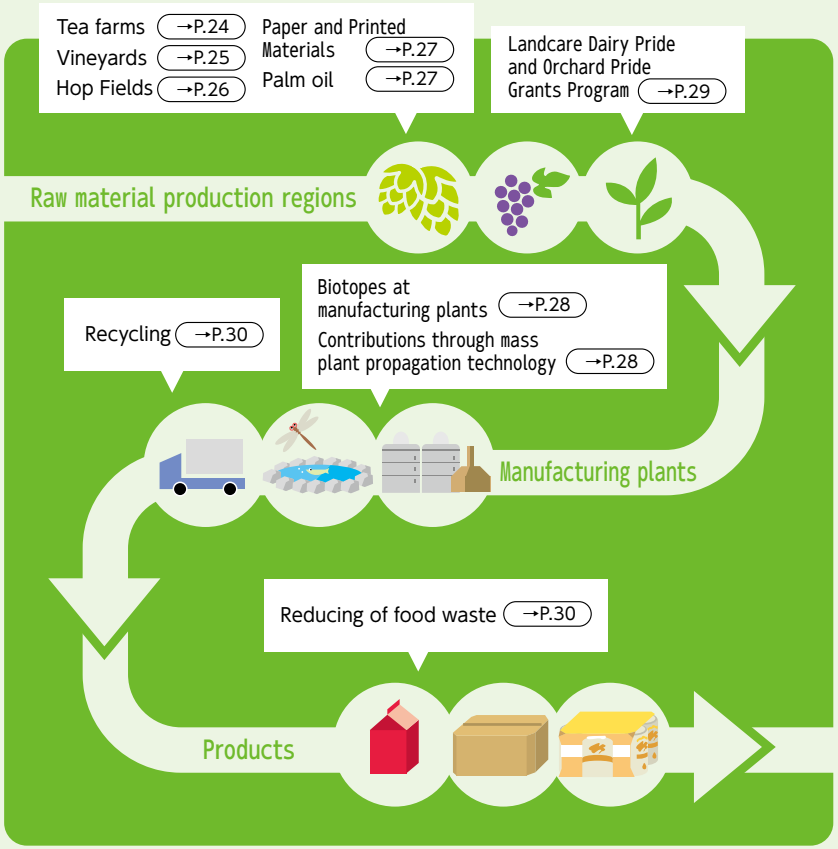
CO_2 reductions across value chain

30% reduction
Kirin group-wide (compared to 1990)

Biological Resources

Basic Thinking

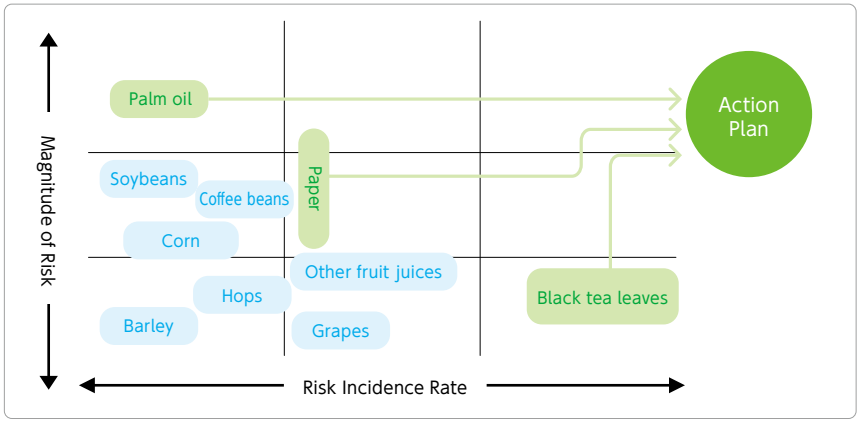
Biological resources, particularly agricultural products, are the most important and fundamental raw materials of the Kirin Group. However, inconsiderate agricultural practices will have a major impact on local ecosystems and communities in the regions where these raw materials are produced. Climate change also has the potential to affect the yields and quality of biological resources. Having assessed the risks related to biological resources that will become our ingredients, we are pursuing initiatives to increase the sustainability of important biological resources, reduce impacts on the ecosystems and local communities of their production regions, and increase the value of those resources.



Overview of Approaches

The Kirin Group established its Declaration of Support for Biodiversity Conservation in 2010 and conducted an assessment to confirm the risks of agriculture to the environment, human rights, and other factors. Based on the results of that assessment, we selected paper and palm oil, which are believed to have a major impact on their production regions, and black tea leaves from specific regions that we are highly dependent on for supply, and developed action plans for those ingredients. Under these plans, we are using sustainability-certified ingredients and assisting farmers to obtain sustainability certification.
In Japan, as well, with the decline in the area of hops fields due to the advanced age of Japan's hops farmers and the enlargement of vineyards to expand the market for Japan Wine, we are working on ecological surveys and regeneration activities for rare and native species which take environmentally-friendly farming practices into account.
Furthermore, from the perspective of the effective use of biological resources, we have set targets for the reduction of food waste and are working toward those targets.
Over the medium to long term, impact on yields and quality of agricultural products from climate change are envisaged. In addition to water risk assessments in agricultural production regions in 2017, we have conducted surveys and assessments continuously in 2018 and 2019 on yields of key ingredient agricultural products and water stress in the production regions due to medium to long-term climate change, and we continue to consider and assess relevant strategies.

■Risk research



Highlights of Outcomes

Challenges	Progress
Sustainable use of biological resources	For black tea leaves, in addition to providing assistance for large tea farms in Sri Lanka to obtain certification, we also started providing similar assistance to small tea farms in 2018. For paper containers and packaging, we achieved 100% use of FSC®-certified paper for major containers and high percentages of use of either FSC®-certified paper or recycled paper in our offices. For palm oil, we have continued our 100% use of certified palm oil (primary and secondary materials) according to RSPO's Book & Claim method.
Securing biodiversity in Japanese farming land	We have conducted surveys that reveal that converting idle farming land into vineyards for Japan Wine would lead to the regeneration and creation of quality grasslands, and have launched revegetation activities with the participation of employees and local residents.
Reduction of food waste	We established reduction targets for Japan (75% compared with 2015 in 2025). As well as promoting resource recycling, we continue to promote the use of "year-month labeling" for best-before periods of non-alcoholic beverages in Japan.

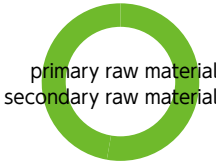
Progress

Ratio of sustainable raw materials

Number of small farms assisted to obtain Rainforest Alliance certification

1.2%

Rate of RSPO certification through Book & Claim



100%

Rate of FSC-certified paper use

100% 98%

Number of species discovered in fields

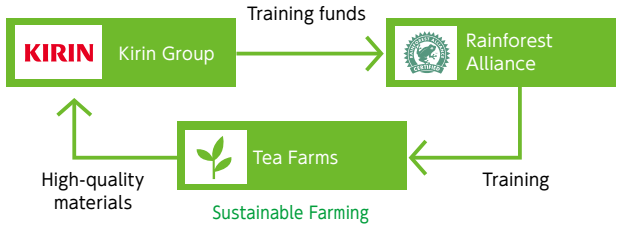
Tea farms

Assistance to obtain Rainforest Alliance

Kirin Gogo-no-Kocha has been a top-selling brand in Japan for more than thirty years. When we conducted a biodiversity risk assessment in 2010-2012, we learned that about 25% of the black tea leaves imported into Japan from Sri Lanka are used in Kirin Gogo-no-Kocha. In response to this fact, in 2013, we began providing assistance for willing Sri Lankan tea farmers to obtain Rainforest Alliance certification. A total of 44 farms had obtained certification by the end of October 2017, and a total of 70 farms have obtained certification as of June 2019. When tea farms obtain certification, they are able to farm in environmentally-friendly ways, engaging in forest conservation, surveys and protection of wildlife, and the separation and recycling of waste.

*Source: 2011 Tea Statistics, Japan Tea Association

Supportiing Growers Obtain Rainforest Alli ance Certification



Certification also has considerable benefits for farm workers and helps to improve the sustainability of farm management. For example, farmers are preventing the loss of fertile topsoil due to heavy rainfall in the rainy season by planting grasses with deep roots on the steep slopes of their farms, and efforts to reduce the use of chemical pesticides and fertilizers are contributing to farm management by, for example, improving the health and safety of farm workers and reducing costs.

In addition, some farms have started researching ways to greatly increase their yields, and initiatives for chemical-free farming.

Assistance for small farms and conservation of farm water sources

Based on what has been achieved so far, we launched three new initiatives in a new three-year plan in 2018 to further increase the sustainability of tea farmers.

❶ Expansion of training programs for large farms

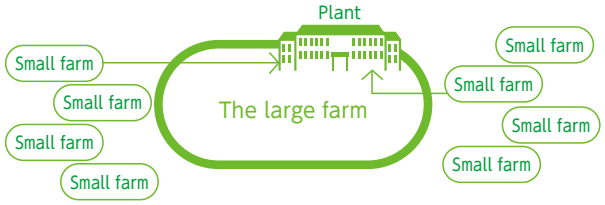
We will further increase the percentage of our Sri Lankan suppliers that are highly sustainable farms.

❷Commencement of assistance for small farms to obtain certification

In Sri Lanka, many small, family-run farms exist alongside the large-scale tea farms. There are said to be several hundreds of thousands of such small farms in Sri Lanka. The tea leaves grown on these small farms are collected by government-qualified collectors and sold on to the large farms, before being processed in the factory and shipped. Tea leaves from small farms can sometimes account for as much as half or more of the tea leaves processed in the large farms' plants, but there has been very little progress in small farms obtaining certification. For this reason, we determined that our efforts to ensure the sustainability of tea leaves would be limited if only the large farms were certified, and we began assisting small farms to obtain certification in 2018. We plan to have assisted 10,000 small farms to obtain certification by 2025.

In the certification of small farms, multiple farms join up to form teams and decide on the team leader. We first educate these leaders, who then educate the other farms in their team on the certification criteria to obtain the certification.

Establishing methods for distinguishing between harmless and noxious weeds, and only removing the weeds that have an adverse impact on the tea bushes will make it possible to grow tea without the use of chemical pesticides. This will reduce the costs of farm chemicals and improve farmer earnings, while also increasing the safety of the tea leaves.



Target

Number of small farms assisted to obtain Rainforest Alliance certification (2025): 10,000 farms

Target number of residents educated on importance of water (2020): 15,000

❸Commencement of activities for the conservation of tea farm water sources

We have commenced conservation activities for water sources on tea farms in Sri Lanka. For details, see "Conservation activities for water sources on tea farms" on Page 34.

Vineyards

Ecological surveys of vineyards for Japan Wine

With the expansion of the market for Japan Wine, Mercian, whose history dates back to the establishment of Dainihon Yamanashi Wine Company, Japan's first private-sector winery, plans to increase its production capacity of Japan Wine by 50% by 2027. To achieve that aim, it will need to expand its company-managed vineyards from its current 50 hectares to 76 hectares by 2027. Because this will require converting idle farming land into vineyards, since 2014, we have been conducting ecological surveys on vineyards for Japan Wine in conjunction with the National Agriculture and Food Research Organization's Institute for Agro-Environmental Sciences and the Western Region Agricultural Research Center (NARO). The ecological survey being conducted at Mariko Vineyard, a Mercian-managed vineyard on the Jinba Plateau in the Maruko District in Ueda, Nagano Prefecture, has confirmed the presence of 168 insect species and 288 plant species, including rare species that are specified in the national-level and region-level Red Data Books. The vineyard is cultivated in hedgerow style, with grasses grown under the vines. That underbrush is cut several times a year for soil management and operational purposes. It is believed that this large number of diverse living creatures may be attributed to the fact that this mowing exposes native and rare species to the sun, giving the vineyard a role as a vast grassland of good quality. Grasslands are said to have covered 30% of Japan's national land area 130 years ago, but they have dwindled to just 1% today. Converting idle farming land into vineyards for Japan Wine will not only contribute to the expansion of the business. It will also create valuable grasslands and lead to the expansion of Japan's traditional rural Satochi-Satoyama landscapes.

Rare species discovered

Related Information→P.31


Zygaena niphona niphona


Sophora flavescens


Hemerocallis citrina var. vespertina


Argyronome laodice japonica


Leonurus japonicus

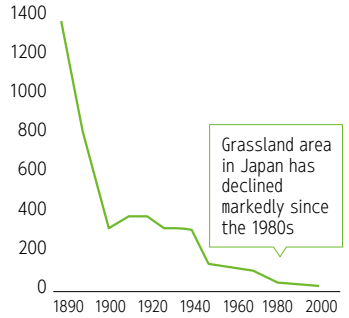

Vincetoxicum pycnostelma

Surveys in the process of converting idle farming land into vineyards

The surveys of the Mariko and Jyonohira Vineyards were conducted more than ten years after those lands were converted into vineyards, so it is impossible to compare them to the original idle farming land. For this reason, ecological surveys are being conducted in the process of converting idle farming land into vineyards in Kamiodawara in Koshu, Yamanashi Prefecture.
When the survey began in 2016, the land was still idle. Only an extremely small number of insect and plant species were found, due to damage from deer eating the vegetation. However, after the land was converted to a vineyard in 2017 and fenced off, it was confirmed that plant diversity had started to recover. A seed trap survey conducted in 2017 has raised expectations of seeds entering from outside the land. Planting of the vines has begun, but cultivation of grasses is still in the preliminary stages, so no major changes have yet been observed. We plan to continue with the survey for about next five years.

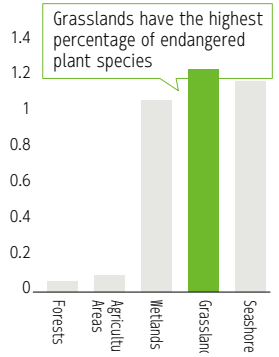

The vineyards are also vast grasslands.

Trends in grassland area in Japan



Aggregated from Successive-Year Forest Area Statistics and MAFF Statistical Tables

Number of endangered species by unit area



Endangered plant species per hectare
Source: Western Japan Grasslands Research Group (2007)

Vegetation regeneration activities with participation by employees and local residents

These ecological surveys have confirmed that in vineyards for Japan Wine, the grasses grown under the vines are creating rich ecosystems and nurturing rare species. However, the number of these rare species is by no means large.
In 2016, under the guidance of NARO, Our employees began participating in activities to regenerate rare and native species. Dry grass from the areas inhabited by rare species are collected in autumn and scattered in the regeneration zones, with the aim of regenerating the vegetation in those zones. In 2016, the average number of native species per square meter was 8.2, but this had risen to 12.0 in 2017 and 14.2 in 2018, confirming that diversity is steadily being restored to the land.
In 2019, with the cooperation of an international NGO, we conducted activities to regenerate Sophora flavescens, which is the sole grass used for feeding by the rare butterfly, Shijimiaeoides divinus.


We have begun activities to restore native and rare species.

Hop Fields

Status of Japan-grown hops

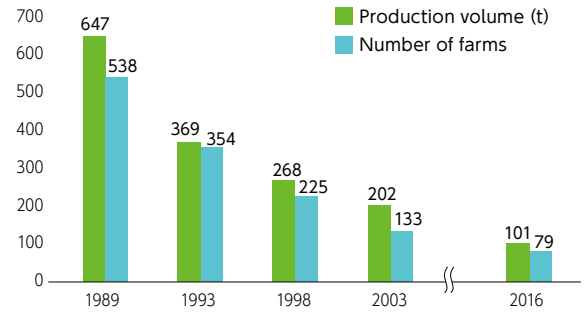
Hops grown in Tono in Iwate Prefecture are the main ingredient of Kirin's Ichiban Shibori Toretate Hops Draft Beer The harvested hops are snap-frozen in their raw state to –50° C before being ground for use in beer production. It is precisely because the hops were grown in Japan that this product has been made possible. Moreover, with the expansion of the craft beer business, the importance of distinctive, Japan-grown hops is increasing.
However, due to the aging of the farming population and a lack of successors to take over the farms, the production volume of Tono hops has fallen to a quarter of its peak, and there is a possibility that it could disappear completely in ten years' time. In response to this situation, Kirin, which purchases 70% of Japan's hops crop, is pursuing a range of initiatives to increase the value of Japan-grown hops.

Hops Fields Living Species Survey

We have been conducting an ongoing living species survey in the Tono hops fields since 2014. In 2015, the survey confirmed the presence of 104 insect species and 19 bird species. This rich diversity of living species in the hops fields is attributable to the existence of windbreak forests that protect the hops plants, which grow to a height of 5 meters, from the effects of the wind. The combination of the windbreak forests and underbrush is nurturing a wide diversity of living creatures. This has made it clear that human innovations for the cultivation of hops have nurtured and protected the diversity of living species in the area surrounding the hops fields. We hope that these kinds of research findings will help to stem the decline in the area's hops fields.

Diverse forms of life inhabit the wind-breaking forests planted to protect the hops and the underbrush planted to prevent drying of the ground.

Hops production volumes and number of farms



Source: *Data Regarding Hops (2016)*, Iwate Prefectural Government

Initiatives for increasing the value of Japan-grown hops

In Tono, Kirin and the City of Tono have launched the TK (Tono x Kirin) Project to take maximum advantage of the appeal of hops and revitalize the region. Project activities include the Hops Harvest Festival, which it is hoped will nurture civic pride in the crop. Kirin is also helping to expand demand for Japan-grown hops by supplying it to craft beer companies. We are also engaged in a wide range of activities, such as a "summit" with hops growers and other stakeholders to revitalize Japan-grown hops production.

Living Species Observation Event

We have held Living Species Observation Events since 2016, inviting local elementary schoolchildren to participate. We hope that, as the children encounter many living creatures in the hops fields and in the surrounding vegetation and nearby streams, they will gain a fresh appreciation for the rich diversity of nature in Tono and for the fact that the hops fields form a part of that diversity.

Initiative to enrich ecosystems

In 2017, we launched an initiative to enrich the ecosystems of the hops fields, with the participation of employees. This initiative included mowing the grass and thinning out trees that shut out the sunlight. The branches that were cut down were piled into stacks to make habitats for small creatures such as insects and reptiles.

Paper and Printed Materials / Palm oil

Use of sustainable paper and printed materials

Because the Kirin Group uses large quantities of paper for primary and secondary containers for shipping our products, in 2013, we established our Guidelines for the Procurement of Sustainable Biological Resources and an Action Plan, and have since pursued the use of paper that will not harm precious forests, including the tropical rainforests.
We also use large quantities of paper for purposes other than containers and packaging, so in the Action Plan, which was revised in February 2017, we declared a target of switching to FSC®-certified paper or recycled paper for all office paper by the end of 2020.
To date, we have switched to FSC®-certified paper for business cards, envelopes and copy paper, and from 2019, progress is being made in the adoption of FSC®-certified paper for some of the paper bags and paper cups for tastings that have the KIRIN logo printed on them.
These efforts are leading to the conservation of precious forests and to addressing the problem of climate change.

Paper containers and packaging initiatives→P.43

Envelopes

Kirin CSV Report 2019

Paper bags

Kirin product catalog

Use of sustainable palm oil

The Kirin Group uses palm oil as an ingredient in some of its products, but because the quantity we use is very small and it is difficult to procure physically certified oil, we use the Book & Claim method approved by the Roundtable on Sustainable Palm Oil (RSPO) for the procurement of certified sustainable oil. In accordance with our Action Plan for the Sustainable Use of Biological Resources, we have been using this method for the total volume of primary raw materials every year since 2013 and the full volume of secondary raw materials as well from 2014.
In March 2018, we became an associate member of the RSPO. We will continue to promote the use of sustainable palm oil.

Policies regarding biological resources→P.77

In-house tools

Reply postcards

The Local ecosystem

Protection of endemic species in biotopes at manufacturing plants

Using biotopes set up in the grounds of our manufacturing plants, we are protecting species that are endemic to the plants' respective areas and providing consumers with the opportunity to engage with nature.

At the Kirin Brewery Yokohama Plant, in an endorsement of the "Yokohama b Plan," the city's biodiversity action plan, we built a biotope in the Plant grounds in the summer of 2012. The Yokohama Plant, which is part of a widespread network of ecosystems, is pursuing initiatives to enrich the local ecosystem as a whole. Also, since 2012, the Plant has conducted "Tours to Experience the Blessings of Nature" every week from spring through fall, in collaboration with the Tsurumi River Catchment Network, a NPO which is highly conversant with the region's natural environment.

In October 2018, the Plant received the Japan Greenery Research and Development Center Chairman's Award.

The Kirin Brewery Kobe Plant has been cultivating local endangered species, including the fish species, Hemigrammocypris rasborella (golden venus chub), and Pogonia japonica, a species of orchid, in the biotope set up in 1997. This biotope functions as a "refuge biotope" for the protection and cultivation of local endangered species.

The Kirin Brewery Okayama Plant has been pursuing a program for the artificially breeding of the Parabotia curtus or "kissing loach," which is a designated natural monument (protected species), since 2005. The fish population having increased with the cooperation of stakeholders and local elementary schoolchildren, they were released into the Plant's biotope in 2016 and are now being bred and displayed on the Plant grounds.

Related Information→P.81

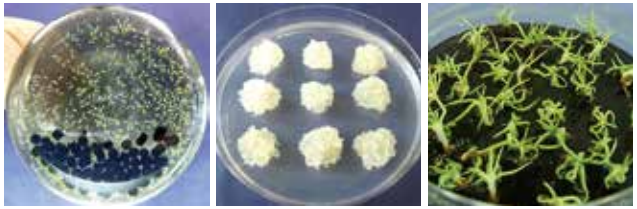
Biotopes in the Kirin Brewery Yokohama plant

Biotopes in the Kirin Brewery Kobe plant

Contributions through mass plant propagation technology (Tohoku reconstruction assistance)

For two years from 2014, Kirin Holdings' Central Laboratories for Key Technologies was involved in the Ministry of Agriculture, Forestry and Fisheries project, "Dramatic Improvement of Production of Seeds and Seedlings of Bursaphelenchus Xylophilus - Resistant Black Pine for Regeneration of Coastal Forests in the Tohoku Region."* We remain engaged in the regeneration of the coastal protection forests that suffered devastating damage from the tsunami in 2011. In 2017, black pine seedlings produced using technology developed by the Kirin Laboratories were planted in the grounds of the Kirin Brewery Sendai Plant on a trial basis. In 2018, the Laboratories conducted a study of those seedlings together with the students of Miyagi Prefecture Shibata Nourin High School, who assisted with the development. The Laboratories also participated, together with the Kirin Brewery Sendai Plant, in tree-planting activities organized by Miyagi Mori-no-Kai, conducting new trial plantings in disaster-affected coastal areas of Higashi-Matsushima.

The Central Laboratories for Key Technologies will continue its research and development with the aim of contributing to the early regeneration of the coastal protection forests.



Cultivation of asexual embryos

Trial planting of seedlings cultivated from asexual embryos

Status of trial planting study at Kirin Brewery Sendai Plant

* Agriculture, Forestry and Fisheries Industry/Food Industry Science and Technology Research Promotion Project (lead institution: Forest Tree Breeding Center, Forestry and Forest Products Research Institute, Forest Research and Management Organization)

Vending machines for the support of the Borneo Green Corridor

Japan depends on imports for a large percentage of its food requirements. Meanwhile, environmental destruction in the source regions of those imports is becoming increasingly serious. Together with Borneo Conservation Trust Japan, we are rolling out these vending machines to support a project to establish a Green Corridor and Wildlife Rescue Center in Borneo.

Expansion of book donations to elementary schools

The Kirin Group has continued to donate bookshelves and books to elementary schools attended by the children of Sri Lankan tea farm workers since 2007. It has already donated to about 120 schools so far and plans to increase that number by a further 100 schools by 2022.

Lion Landcare Dairy Pride and Orchard Pride Grants Program

Since 2015, Lion Dairy and Drinks have partnered with Landcare to offer their dairy farmers the opportunity to be part of the Lion Dairy Pride Landcare Grants Program. In 2018, the program was extended to include orange growers, under the Lion Orchard Pride Landcare Grants Program.

Under the 2018-2019 program, grants of up to $10,000 each were made available to help both Lion Dairy and Drinks dairy farmers and orange growers to develop more sustainable practices on their farms or orchards, increase business efficiencies, lower their operating costs and secure the long-term sustainability for their business.

The program offers farmers who supply Lion Dairy and Drinks a way to measure, evaluate and improve key areas of sustainability on their farm, focusing primarily on improving land management, biodiversity, increasing energy efficiency, and, this year in particular, increasing water efficiency.

The Landcare grants program forms part of Lion's Dairy Pride and Orchard Pride initiatives, unique sustainability programs that provide Lion Dairy and Drinks agricultural suppliers with a way to measure, evaluate and improve key areas of sustainability on their farms.

Previous grant recipients have implemented initiatives such as solar installation to reduce power costs and greenhouse gas emissions, planting of windbreaks to prevent soil erosion and create native habitats, upgrading lighting to more energy efficient LED, implementing heat recovery from milk, improving effluent dams and capturing effluent water for reuse.

The program is one of the many initiatives Lion Dairy and Drinks have put in place to create a more sustainable business across their agricultural supply chains and to support their dairy farmers and orange growers.



Reducing of food waste

Reducing losses from disposing of soft drinks

Kirin Beverages is taking concrete action to change to labeling the year and month as the best before date for soft drinks. By so doing, we expect to see significant effects on cutting losses from disposing of products. Also, we can cut environmental loads on the supply chain (CO_2 emissions from transporting between distribution centers and transport-related activities, etc.) and reduce inefficiencies (e.g. storage space in distribution warehouses and loading and unloading tasks at stores) as well, by changing how to manage product delivery, storage, and display in stores based on the new best-before labelling. We also continue to exchange information on retail sales and demand fluctuation factors with plants and distribution centers to improve demand projections and reduce disposal losses. In addition, we will move forward with efforts to reduce disposal losses by strictly managing sales volume targets. Implementing these steps, we will prevent valuable biological resources and containers and packaging from going to waste.

Recycling

Recycling spent grains from Beer Mashing as Livestock Feed

Kirin Brewery | Myanmar Brewery

Production processes for beer and happo-shu (low-malt beer) generate spent grains after extracting flavor during the mashing process. Because such spent grains contain residues of nutritious substances, they are efficiently used as livestock feed for cattle or for growing mushrooms.

Developing food products from brewer's yeast

Lion

Used brewer's yeast generated in the process of beer manufacture is used as the ingredient in the Australian fermented food, Vegemite.

Research into use of BSG

Kirin Holdings

Prevention of disease in dairy cattle and other livestock and reducing the use of antibiotics are major challenges for the dairy industry. The Central Laboratories for Key Technologies have discovered that lignin glycoside, which is contained in brewer's spent grain (BSG), that is the barley husks that remain after the barley milling process, and BSG itself, which is used to feed livestock, are effective in increasing immunoreactivity in cattle. The Laboratories are pursuing further research into these findings.

Re-use of wine grape lees

Mercian

The grape lees from wine-making are turned over in a compost heap on the company vineyard for a year to make compost, which is used as organic fertilizer.

Recovery of phosphoric acid

Kyowa Hakko Bio

Kyowa Hakko Bio Yamaguchi Production Center (Hofu) has installed a facility to recover phosphoric acid from fermentation wastewater. Previously, the recovered cake, which consists largely of calcium phosphate had been disposed as industrial waste, but in 2008, the Production Center started drying some of the cake and selling it as fertilizer material.

Re-use of wine grape lees

Effective use of spent grains to livestock feed

Food bank Food donation (LDD)

Food poverty has impacted an estimated four million people at some point in the past year in Australia, which is 18% of Australia's population. For the last seven years, Lion has partnered with Foodbank as part of Lion's Community Investment Program. Foodbank, established in 1992, is Australia's largest food relief charity. They distribute food and other essentials to over 710,000 people each month. The most common recipients of Foodbank meals are typically single-parent and low-income families. Other high-risk groups include people with disabilities, elderly, refugees and Indigenous Australians.

Last year, Lion Dairy and Drinks donated the equivalent of over 3 million meals. Through the Foodbank Milk Program, Lion donated 230,000 litres of fresh white milk from our manufacturing plants in Western Australia, South Australia and Tasmania. Lion also contributed other products, such as dairy foods, juice and plant milk products.

In addition to food and beverage donations, Foodbank is also a key part of Lion's corporate volunteering program, LionHearts. Approximately 150 Lion employees volunteered over 1,000 hours of time last year, at various Foodbank warehouses in Victoria and New South Wales. By giving their time, Lion employees help ensure Foodbank support those in need by:

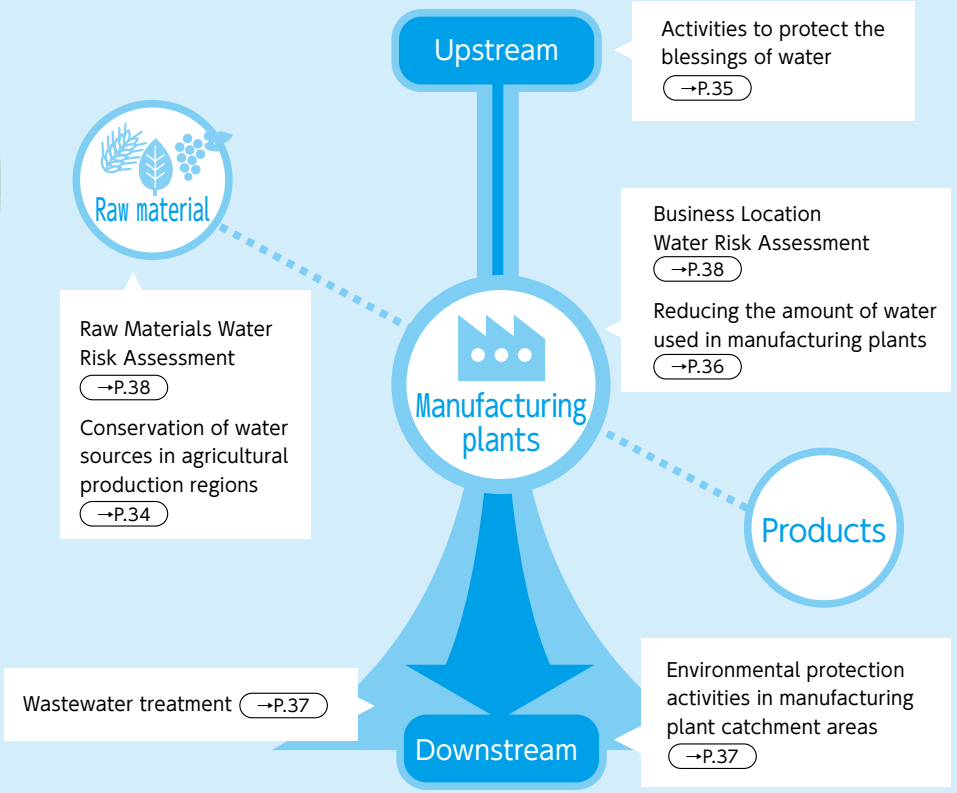
- Ensuring struggling Australians receive the food they require to put breakfast on the table or to pack their child's school lunchbox.
- Packing orders for rural and remote charities so an Australian farmer can make it through a tough harvest without having to seek other employment.
- Organising other donations so a domestic violence victim has access to hygiene essentials for the next month.

Through Lion's ongoing partnership with Foodbank, we are supporting the United National Sustainable Development Goal 2, Zero Hunger.

Water Resources

Basic Thinking

As well as being a basic raw material for the Kirin Group, water is also an indispensable resource for washing the tanks and pipes in the manufacturing equipment. Furthermore, water is an essential resource in the production of the agricultural products that are our ingredients.
On the other hand, water resources are unevenly distributed around the earth, and different countries and regions have different risks associated with water.
The Kirin Group conducted assessments of water risks in the catchment areas around our manufacturing bases and upstream of the value chain.



Overview of Approaches

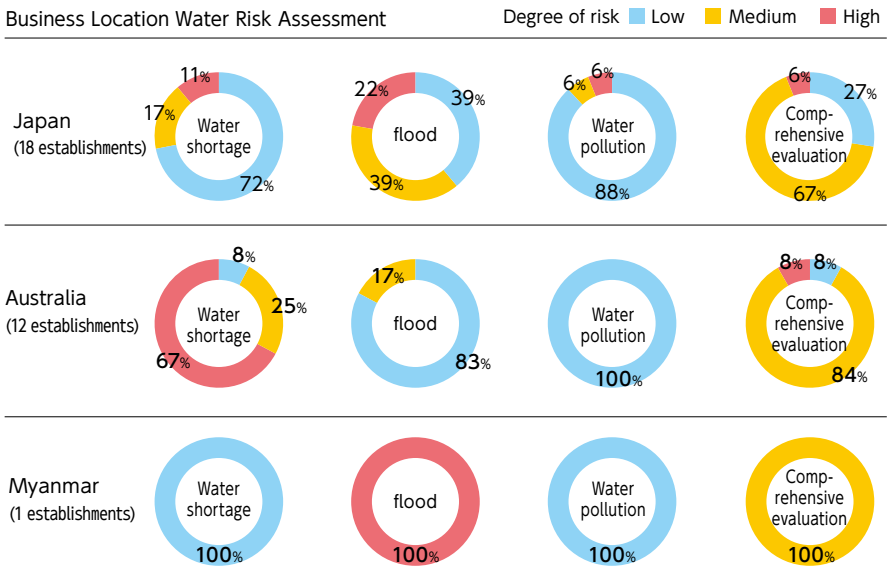
The Kirin Group has promoted the effective use of water resources from an early stage. In our manufacturing processes, we have established frameworks for the confirmation and assurance, from a quality perspective, that the pipes and tanks in our manufacturing equipment have been washed properly, and we have achieved major water savings through the implementation of a cascading system of water use and the installation of advanced industrial water treatment equipment. In particular, we have achieved some of the world's highest levels of water conservation in Australia, which has a high degree of water stress.

We are also leading the industry in forestation activities to protect water source at our breweries in Japan. These efforts are currently ongoing in 12 locations. We have further commenced educational programs in Sri Lanka to teach residents about conservation of water sources inside the tea farms there and about how to use water wisely.

On the other hand, water resources are unevenly distributed around the earth, and different countries and regions have different risks associated with water. In 2017, following on from similar surveys conducted in 2014, we conducted water risk assessments in the catchment areas that the Kirin Group's 44 business locations in nine countries rely on and in the production regions of our major agricultural products. More detailed assessments are currently being conducted in 2018-2019, and the outcomes of these surveys will be reflected in our strategies.

Related Information→P.86～87

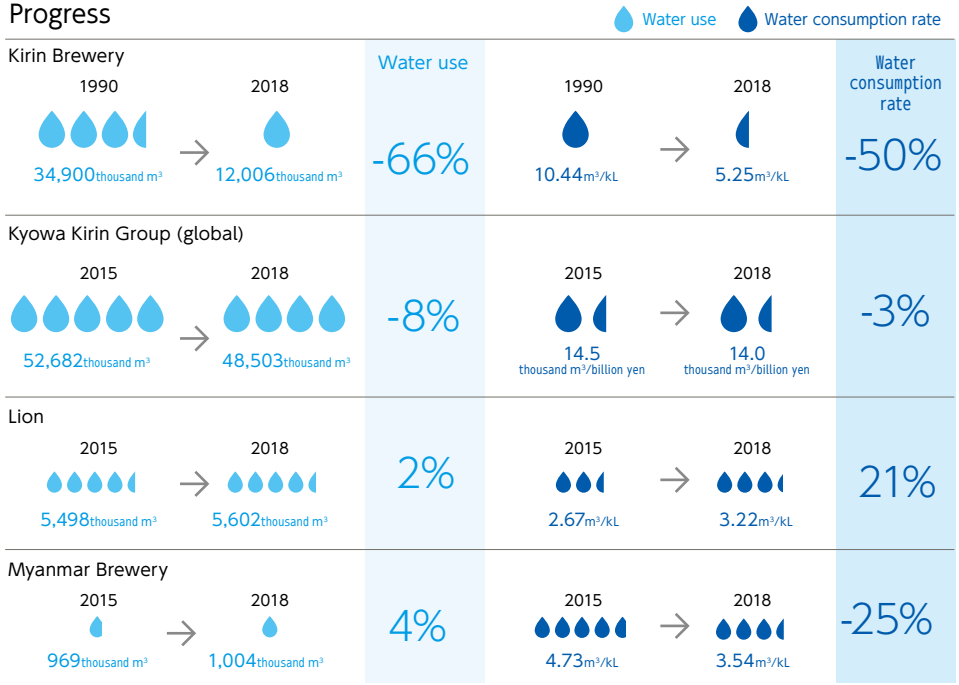
Business Location Water Risk Assessment



Highlights of Outcomes

Challenges	Progress
Promotion of water conservation activities	We are maintaining a high level of water conservation. In 2018, Kirin Brewery reduced its industrial water use by 66% and its water consumption rate by 50% compared to 1990 levels. The same year, the Kyowa Kirin Group as a whole (global) reduced its industrial water use by 8% and its water consumption rate by 2% compared to 2015 levels. Although Myanmar Brewery's industrial water use rose by 4% compared to 2015 in 2018, its water consumption rate fell by 25%. Detailed assessments of water risks were conducted in 2014 and 2017 and are currently ongoing in 2018-2019.
Water source conservation activities	We continued our water source conservation activities in 12 locations across Japan, with 1,129 people participating.
Conservation of water sources in agricultural production regions	We are continuing our conservation activities and education programs regarding water source conservation on Sri Lankan tea farms.

Progress



The production regions

Conservation activities for water sources on tea farms

In the assessment of water risks in the upstream of the value chain conducted in 2017, the Kirin Group ascertained the water risks of the production regions of its major raw materials, including malt and tea leaves.
Based on the results of this assessment, we have decided to take actions starting from the water sources on tea farms in Sri Lanka, where we have been providing assistance for obtaining sustainable tea farm certification since 2013, and where we have close ties with local tea farms and NGOs.
Five water sources have been selected from tea farms that we have assisted to obtain certification.
In the tea farms on the highlands, the tea bushes are planted on steep slopes. The rain flows straight down such slopes which as a result are believed to have lower water source cultivation function compared to that of the mountains and hills where native forest remains. However, in places with good conditions of soil beds and others, rain that falls near the summit and on the tea farm penetrates the ground, and numerous springs gush up in sections of the tea farm. These places are known as micro watersheds.
Micro watersheds on tea farms can be found in the highlands of central Sri Lanka, and, in almost all cases, they are headstreams of any one of rivers. For this reason, while they occupy only a tiny area, they are very precious water sources. In our new initiative, we will fence off these micro watersheds to protect them from being used for other purposes such as growing vegetables or grazing pasture. Also, with the objective of bringing vegetation diversity to single-cropping tea farms, we intend to plant native and endemic species of trees around the micro watersheds. This also serves to ensure that soil that flows down the slopes during torrential rainfall does not flow into the water shed.

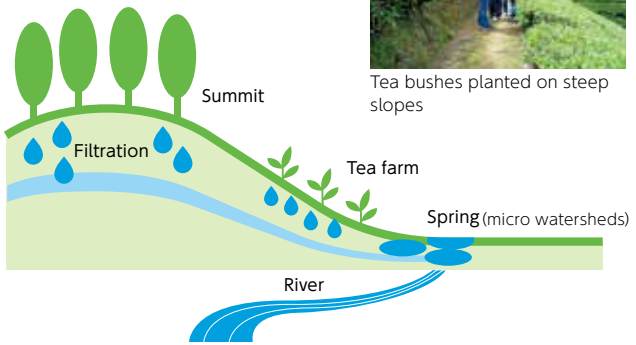

A micro watershed surrounded fenced off


A stream inside a tea farm

Education programs for valuing water

Due to the history of Sri Lankan tea farms, going back to when the plantations were first established, many people live on the tea farms who make a living by doing work that has nothing do with the tea farms themselves. These residents have been generally allowed to use empty plots that are not being used to grow tea for their living.
For this reason, there have been cases in which these residents, not recognizing the water sources, which are called micro watersheds, as water sources, have converted those areas to vegetable patches or grazing pasture, or have cut down the trees around the watersheds for firewood.
Therefore, in order to protect the water sources, instead of merely fencing off to keep the tea farms' residents away, there is a need to educate them that those areas are the water sources we should protect.
In this initiative, we are conducting an education program to teach the approximately 15,000 residents living in the vicinity of these five water sources about the importance of water and about what kind of functions micro watersheds have.
We are also considering including local elementary schoolchildren in the educational program and incorporating it into elementary school programs.

Mechanism of micro watersheds




Tea bushes planted on steep slopes

Improve water security

We Mean Business is a consortium of companies and investors established with the CDP, UN Global Compact, and WBCSD playing a central role. Of the actions declared by We Mean Business, Kirin declared its commitment to the "Report climate change in mainstream reports through the CDSB" action on August 26, 2014, and to the "Adopt a science-based emissions reduction target" action on July 14, 2016.
On December 12, 2016, Kirin agreed to implement the following three things and declared its commitment to "improve water security." We will continue to engage in actions in line with this commitment.

Water sources

Activities to protect the blessings of water

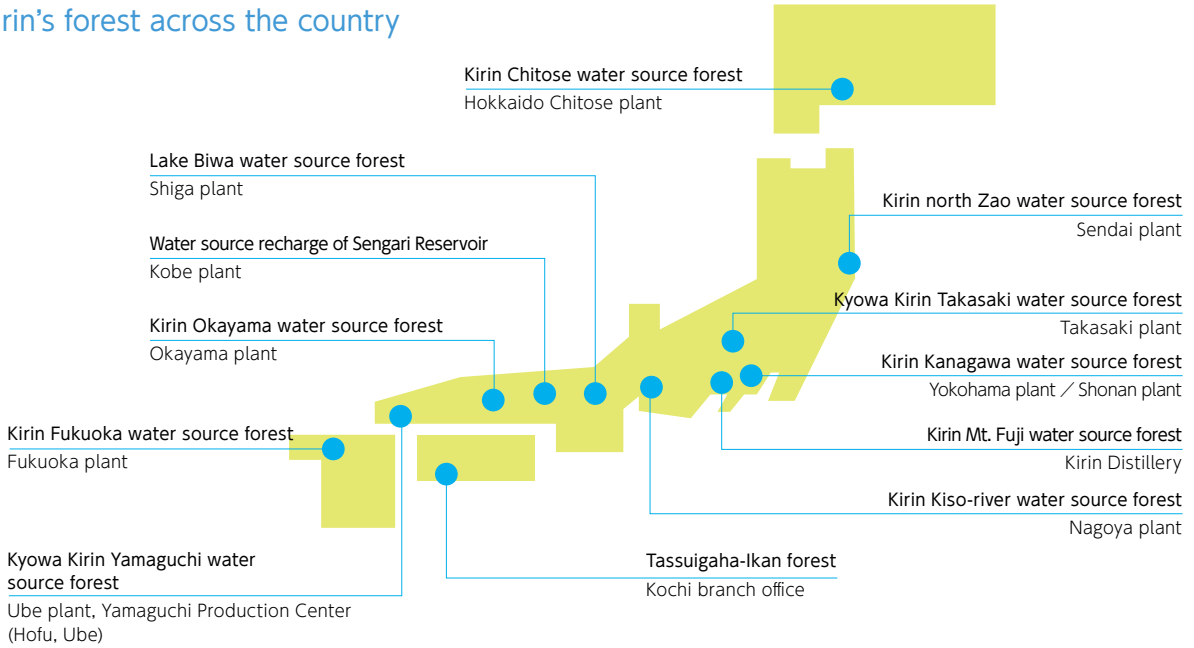
Our Water Source Forestation Activities, which began as an activity to protect the water sources of our manufacturing plants, began in the forest of the Tanzawa district of Kanagawa Prefecture, which is the water source for Kirin Brewery Yokohama Plant in 1999. This initiative, which was a pioneering initiative in the industry, has since been adopted in 12 locations across Japan. Under medium and long-term agreements with the local governments and other relevant parties that manage the water source forests, the program includes tree planting, undergrowth cutting, pruning, and thinning. Today, many of the forests are bright, luxuriant forests. In some locations, some of our customers have volunteered to take part in the activities. In 2018, 1,129 people took part in activities for a total of 13 times.

Kirin Kiso-river water source forest

Actual records of Water Source Forestation Activities in FY2018

Number of implementations	Number of participants	Locations
13	1,129	9

Kirin's forest across the country



Special tour to encounter forests and water

Kirin Distillery has conducted a special tour, called "Water and Forests Classroom" twice a year or so since 2014, in conjunction with the magazine, Randonnée. This initiative gives participants the opportunity to develop a better understanding about the forests and water.

Voices of Stakeholder

Tsuchi ni Kaeru Ki Forestation Society (NPO)

Forest creation consists of planting, protection and nurturing, and taking advantage of resources. Teaching people who live in cities about forests through cutting work, and giving them hands-on experiences of making things from the thinned wood - all of these things lead to forest creation. We work with the Kirin Group on the Water and Forests Classroom, a reader-participation activity sponsored by Randonnée magazine, and other activities. With the aim of forest creation that anyone can participate in, we will continue to cooperate with the Kirin Group in the pursuit of our activities.

Manufacturing

Water conservation measures according to risks

Reducing the amount of water used in manufacturing plants is a major challenge. The Kirin Group has pursued water conservation through recycling and others in addition to initiatives such as using water only when and as much as needed. Meanwhile, focusing on the water risks in the catchment areas around our manufacturing plants, we have conducted surveys to identify the degree of risk and are installing and operating water-saving equipment according to the level of risk.

CIP equipment

External washer

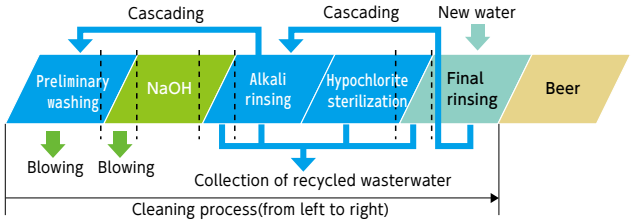
Cascading industrial water

Much of the water used in manufacturing plants is used for washing and sterilizing processes of equipment and pipes. In addition to the establishment of frameworks and mechanisms for the confirmation and assurance, from a quality perspective, that washing is being performed, water flow rate and velocity are strictly controlled to ensure that water is not wasted. We also actively pursue the re-use of water, depending on the purpose.
Specifically, the rinsing water used in the final step of the pipe and equipment washing process is still relatively clear, so it can be used again for the initial process of pipe washing. In this way, we have implemented a cascading system of water use that repeatedly uses water that has been used in washing, according to the quality of the water. In actuality, considerable knowledge on how to use this equipment is needed to achieve the right volume balance of recoverable water and water used and the timing of recovery and use, and to guarantee that the equipment and pipes are being washed properly. The Kirin Group is achieving a high level of water conservation by promoting the activities accumulating various knowledge and ideas through sharing them and feeding back outcomes and otherwise.

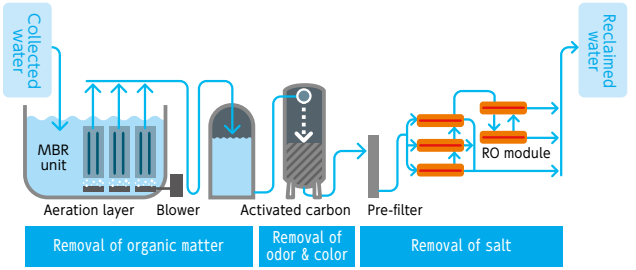
Advanced water treatment equipment

Lion is committed to exploring innovative ways to improve water management within the communities it operates. In 2009, Lion commissioned a water recycling plant for its Castlemaine Perkins Brewery – setting out to halve the water used in brewing our classic brand, XXXX Gold. A decade on, the brewery is approaching world class standards in water management and is continually pushing the boundaries of conservation.

Cascading rinse water for washing tanks



Flow of sophisticated water processing facility at the Kobe Plant



The two main uses for water in brewing are water used in making the beer itself – plus water used in the brewing process (around 40-50% of mains water), which is used in non-product related processes, such as cleaning, cooling and pasteurising. In 2009, Lion partnered with the Queensland Government to install a reverse osmosis plant, to recover waste water and minimise our reliance on mains-fed town water.
In 2018, the plant generated more than 220 million liters, the equivalent of 88 Olympic-sized swimming pools. The brewery recycled up to 6.8 million liters per week in 2018. Vitally, the plant enables XXXX Gold to be produced at a ratio of 2.8 liters of water for every liter of beer produced – which is approaching world class levels of water efficiency.
This technology is being shared within the Kirin Group, and is now in use at Kirin Brewery's Kobe Plant.

Wastewater

Wastewater treatment

It is our obligation as a company that uses water as a raw material to ensure that our wastewater is returned to nature in pristine condition. In the Kirin Group, the water that we have finished using is purified to voluntary standards that are stricter than those required by law, before being released into rivers and sewers.
State of wastewater quality→P.93
In the anaerobic treatment process used to treat wastewater, a biogas, with methane gas as its main constituent, is obtained. This gas is used to generate electricity at boilers and co-generation systems.
This is a renewable energy derived from plant-based raw materials, such as malt, so is a CO_2-free energy.
Related Information→P.58

Environmental protection activities in manufacturing plant catchment areas

The various manufacturing plants of the Kirin Group are conducting a range of environmental protection activities, particularly riverside clean-up operations in cooperation with local governments and NGOs.
The Kirin Brewery Yokohama Plant, in cooperation with an NPO, Tsurumi River Basin Networking, continues to conduct beautification campaigns at nearby Tsurumi River, Living Species Observation Events and others.
Kirin Brewery, Kirin Beverage, Mercian, Kyowa Kirin, and Koiwai Dairy Products are also engaged in local environmental beautification and environmental protection activities, focusing on the rivers they draw water from and other nearby rivers.


Environmental protection activity in Tsurumi River catchment area

Coastal clean-up activities

A group of 36 people, consisting of employees of Mercian's Fujisawa Plant and their families, participated in the 43rd Zero Trash Clean Campaign - Beach Clean Up Kanagawa 2019, a clean-up activity on the Katase Coast in Fujisawa hosted by the Fujisawa City and the Kanagawa Coastal Environmental Foundation in May 26, 2019. The Plant endorses the goals of this initiative, namely to "conduct a clean campaign to protect the beautiful natural surrounds of the Katase Coast, so that the beaches can be widely loved as a place of rest and relaxation for all," and participates in the campaign every year.
It will continue to widen the circle of volunteers, to take care not to discard trash and call on everyone to be involved in the beautification of the environment on the Katase Coast.


Clean-up activity on Katase Coast in Fujisawa

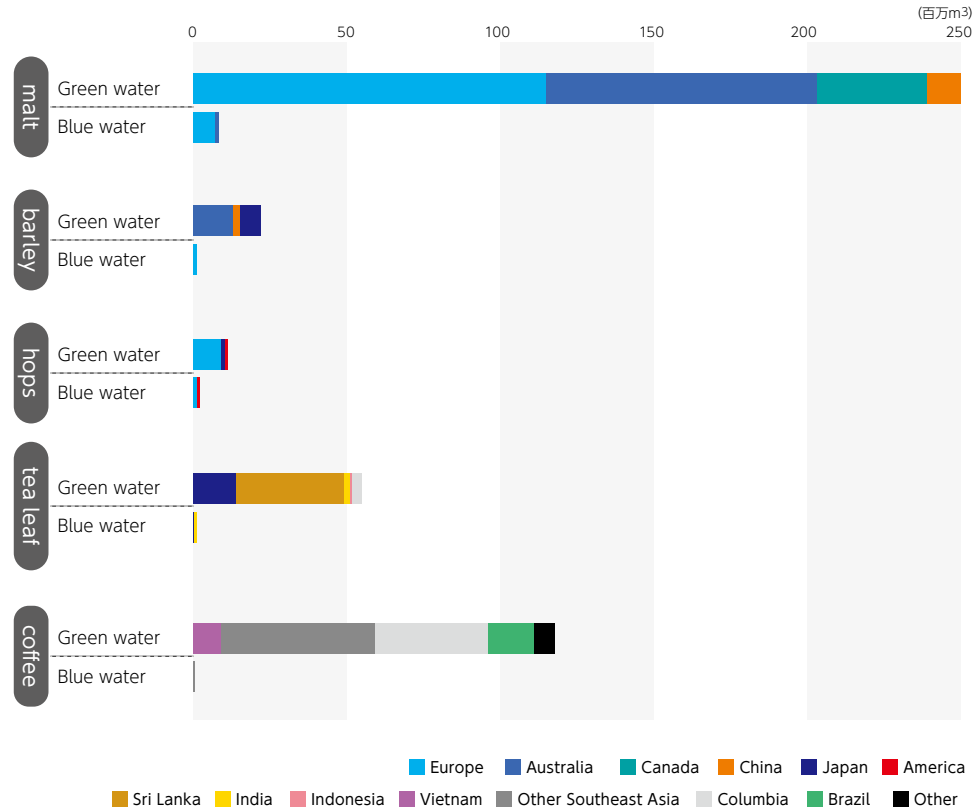
Water Risk Assessment

The results of the water risk assessment of Kirin Group business locations and the value chain water risk assessment conducted in 2017 are as follows.
For the assessment, we used WRI Aqueduct and WWF-DEG Water Risk Filter to simplify the surveys, and took information published by administrations, etc. into consideration.
Forty-four major manufacturing bases in Japan, the United States, China, Thailand, Vietnam, Myanmar, Brazil, Australia, and New Zealand were surveyed.

Business Location

Raw materials

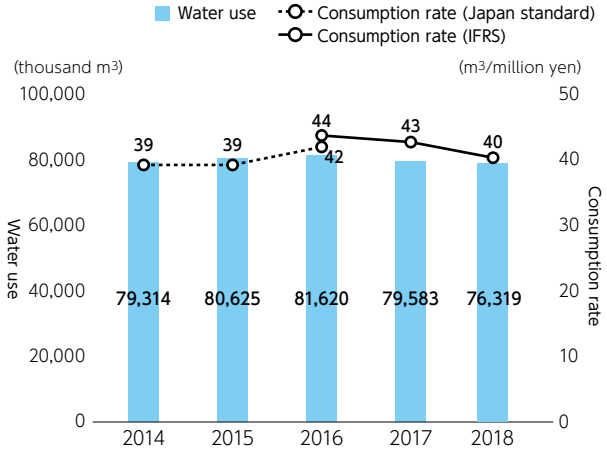
Water use by raw material and country



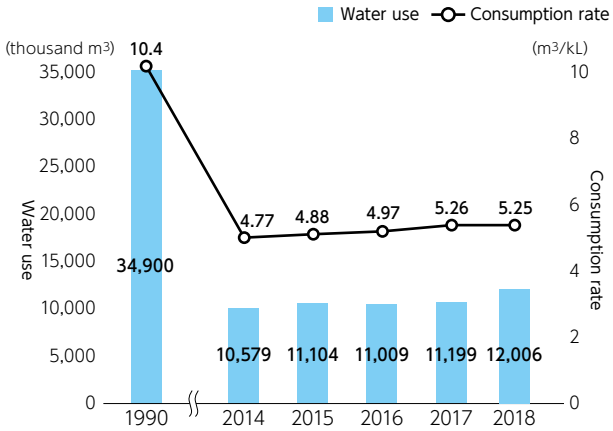
Water Graphs

Related Information→P.86～87

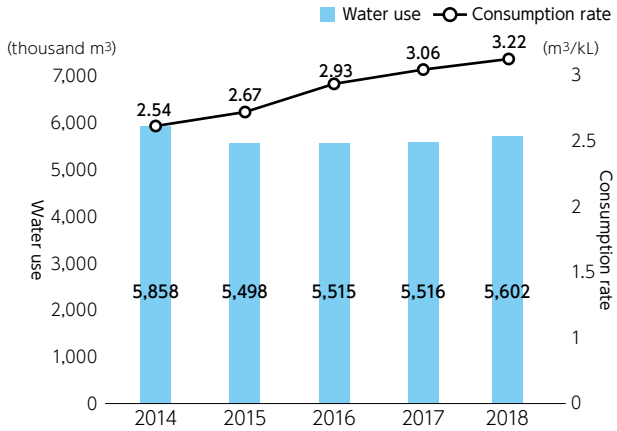
Water use and consumption rate (water use/sales revenue) of entire Group



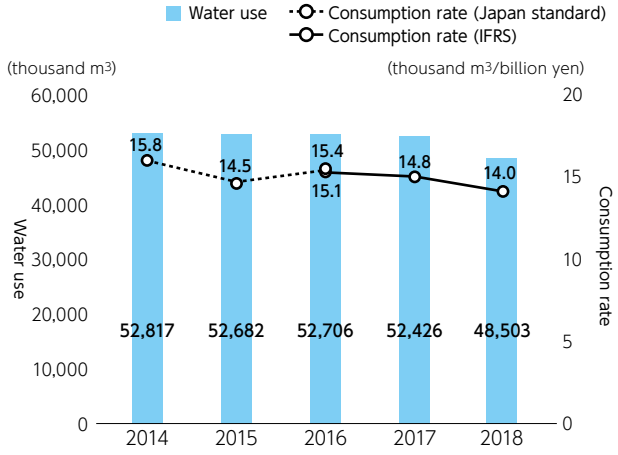
Water use and consumption rate (water use/production volume) of Kirin Brewery



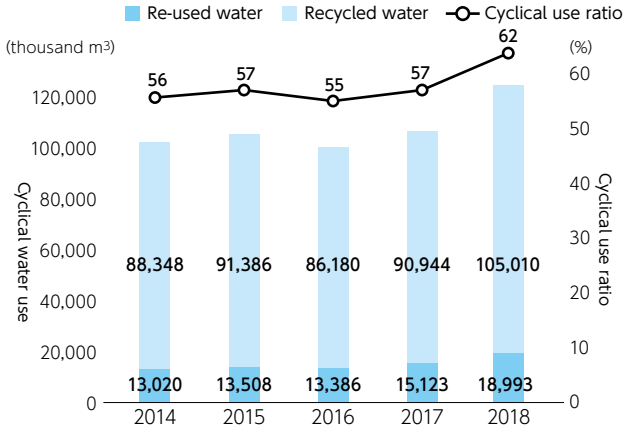
Water use and consumption rate (water use/production volume) of Lion



Water use and consumption rate (water use/sales revenue) of entire Kyowa Kirin Group (global)



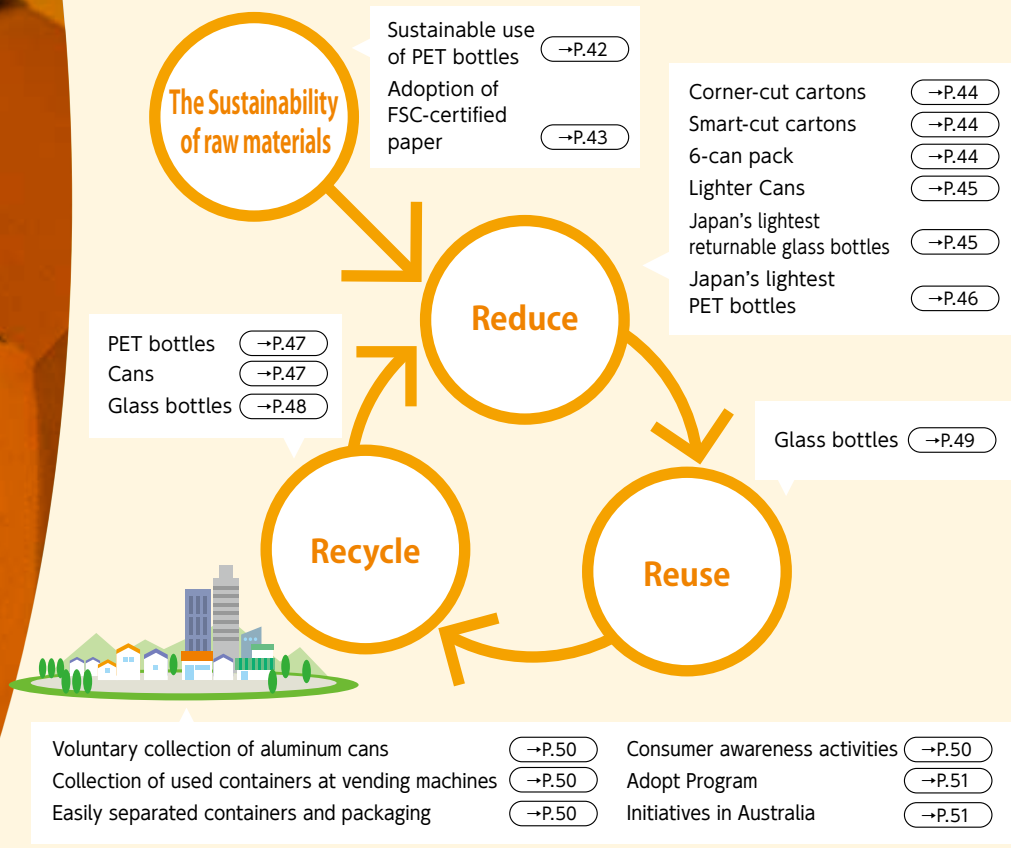
Cyclical water use and cyclical use ratio (cyclical use/ (tap water use + cyclical use)) of entire Group



Containers and Packaging

Basic Thinking

Containers and packaging are essential to protect the quality of our products for delivery to our consumers. However, challenges exist in this area, such as the sustainability of resources used to produce containers and packaging and the generation of waste when they are discarded after use. The entire industry has achieved high recycling rates through the pursuit of 3R in Japan, but we have not yet achieved 100% circulation. Used containers that have been inappropriately discarded into the environment are ultimately polluting the oceans and adversely affecting ecosystems. The Kirin Group will address these problems through the adoption of sustainable raw materials for our containers and packaging and the promotion of appropriate resource circulation.



- Voluntary collection of aluminum cans →P.50
- Collection of used containers at vending machines →P.50
- Easily separated containers and packaging →P.50
- Consumer awareness activities →P.50
- Adopt Program →P.51
- Initiatives in Australia →P.51

Overview of Approaches

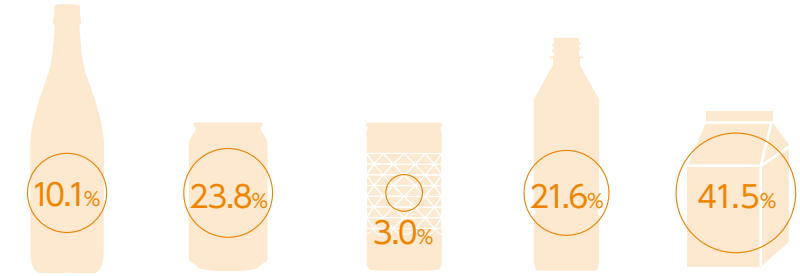
Taking advantage of the strength that is our Research Laboratories for Packaging Technologies, the Kirin Group has achieved the lightest weight in Japan for aluminum cans, returnable glass beer bottles, and 2.0-liter PET water bottles.
We have also established Guidelines on Environmentally Conscious Design for Containers and Packaging and adopted environmentally-friendly containers and packaging.
Further, we have achieved a high rate of recycling through the promotion of 3R (reduce, re-use, recycle), with the participation of industry organizations and the community. In Australia, we are responding to the newly enforced container deposit scheme and we have been appointed as a product management body for the management and operation of the container deposit scheme in certain states.
To address the challenge of plastic waste, which is contributing to marine pollution, in February 2019, we established the Kirin Group Plastic Policy, and have launched initiatives to meet the target of increasing the percentage of recycled plastics in our PET bottles for the Japan market to 50% by 2027 declared in this policy. Also, to ensure there is no illegal logging in regions that produce pulp, the raw material for paper containers and packaging, we have declared a target of adopting FSC®-certified paper for almost all of our paper container and packaging requirements by the end of 2020. We have already achieved 100% adoption for most of our paper containers and packaging.

Highlights of Outcomes

Challenges	Progress
Response to the ocean plastics problem Response to the plastic resource circulation	We have established and announced the Kirin Group Plastic Policy, in which we have declared that we will increase the percentage of recycled plastics in our PET bottles for the Japan market to 50% by 2027.
Expansion of use of sustainable raw materials for containers and packaging	We have commenced sales of beverages in 100% recycled PET bottles. The percentage of recycled plastic used in PET bottles sold in Japan was 2% in FY 2018. For paper containers, we have achieved 100% use of FSC-certified paper for 6-can packs, gift boxes, and cardboard cartons for products, and approximately 98% for drink boxes.
Promotion of 3R/resource circulation for containers and packaging	We have achieved Japan's lightest weight for aluminum beer cans and returnable glass beer bottles and the transition to these containers is now 100% complete. We have achieved a weight of just 28.3 grams for the 2.0-liter PET bottle for Kirin Alkali Ion Water, the lightest in Japan. Our lightweight "pecology bottle" accounts for 33% of large PET bottles, excluding carbonated drinks.

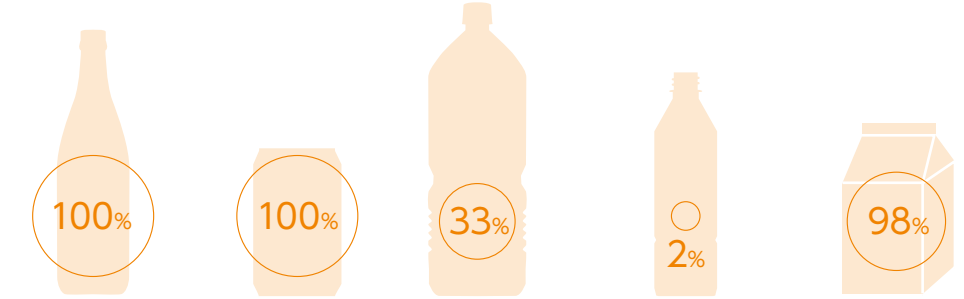
Material mix of containers and packaging in 2018, by weight

Kirin Brewery | Kirin Beverage | Mercian



Progress

*1 Kirin Brewery
*2 Kirin Beverage (Excludes carbonated drink)
*3 Kirin Brewery | Kirin Beverage | Mercian



The Sustainability of raw materials

Plastic Policy

The convenience of plastic has made it a popular material for many different products including containers and packaging. With such a vast range of types and applications of plastics, collection and recycling rates vary depending on the type of plastic used, and it could not be said that all plastics are being efficiently circulated. Plastic waste discarded into the environment is finding its way into the oceans, causing global concern about the potential for marine pollution and adverse impacts on ecosystems.

The issue of plastic waste has become one of the major environment-related social issues. Kirin Holdings established the Kirin Group Plastic Policy in February 2019 with the intention of finding a solution to this issue. In the Policy, to further promote resource circulation of PET bottles, we declared a target of increasing the percentage of recycled plastic in PET bottles for the Japan market to 50% by 2027. We also declared that we would consider the introduction of PET bottles made with plastic derived from inedible plant material, with the aim of moving away from petroleum resources.

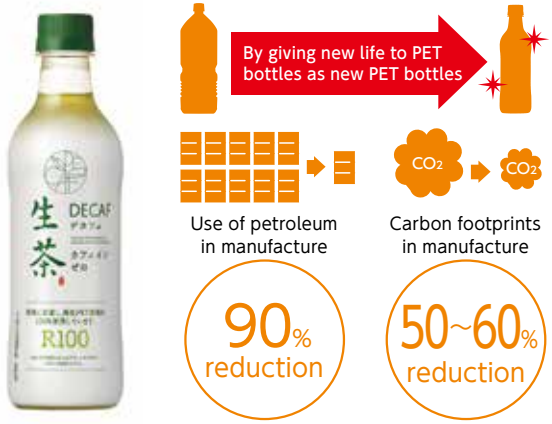
The Kirin Group will promote the sustainable use and resource circulation of plastics by identifying the essential challenges that plastics pose and swiftly pursuing appropriate actions regarding the plastic containers and packaging that the Group provides.

The Kirin Group Plastic Policy

❶Promoting recycling of PET bottles	The plastic containers, packaging, and other materials provided by the Kirin Group are mostly PET used for beverage bottles and the Kirin Group has used recycled resin for a part of them. The Kirin Group will promote the recycling of PET bottles by aiming to increase this recycled plastic ratio to 50% by 2027. The recycling of PET bottles cannot be promoted without an efficient method for collecting high-quality used PET bottles. At the Kirin Group, we will proactively work with national and local governments, and industry organizations to create an efficient collection and reuse system for high-quality used PET bottles.
❷Efforts to reduce single-use plastic* and replace it with other materials	Most plastic waste is comprised of what is referred to as single-use plastic. The Kirin Group will make efforts to reduce the single-use plastic provided by its group companies and replace it with other materials. * Disposable plastic that is used only and not intended for reuse.
❸Improving sustainability of raw materials for PET bottle	At the Kirin Group, we have made continuous efforts to reduce the weight of our PET bottles from the standpoint of reducing our environmental impact. We will keep striving toward even lighter bottles in the future. In addition, to improve the sustainability of raw materials for PET bottle, we will study the introduction of PET bottle materials derived from inedible plants to reduce our dependence on petroleum resources.

In addition to the above measures, we will proactively participate in educational programs to promote plastic recycling, coastal cleanup activities, and other programs.

Kirin Beverage Company, Limited also endorses the Soft Drink Business Plastic Resource Reclamation Declaration 2018 announced last year by the Japan Soft Drink Association, and will take proactive measures to realize the "100% Effective Utilization of PET Bottles by 2030" plan put forth by the industry.



Sustainable use of PET bottles

With the establishment of safe methods for recycling PET plastics that will allow PET bottles to be recycled back into PET bottles, Kirin Beverages is promoting initiatives to use recycled PET materials in its PET bottle production. This method, known as "mechanical recycling," involves washing the bottles before processing them at high temperatures in a condition close to a vacuum state. This volatilizes and removes the impurities stuck inside the plastic, restoring the molecular weight, which is decreased in the recycling process, to a level suited to bottle formation.

Kirin Beverages began using PET bottles made from 100% recycled PET material for some of the packaging of its Kirin Gogo-no-Kocha Oishii Muto (sugar-free) product in February 2014. This bottle uses 90% fewer petroleum resources and achieves a reduction in CO_2 emissions of 60% than regular petroleum-derived PET materials.

In mid-June 2019, this bottle was adopted for 430 ml Kirin Nama-cha Decaf, which bears the R100 mark to indicate that it is made from 100% recycled PET material.

Adoption of FSC-certified paper for containers and packaging

The Kirin Group established its CSV Commitment in February 2017. As the first stage in concrete approaches, we revised the 2013 Action Plan for the Sustainable Use of Biological Resources and announced our goal of switching to FSC-certified paper for all of our paper containers and packaging by the end of 2020. This indicates that we have entered a new stage of pursuing the sustainability of container and packaging materials themselves, and it is positioned as an important approach that deals with the dual challenges of "biological resources" and "containers and packaging" mentioned in our Long-Term Environmental Vision.

A major feature of this approach is that it targets 6-can packs, gift boxes, drink boxes and cardboard cartons for products, which covers almost all of our paper containers. This is the first declaration of its kind to be made by a Japanese manufacturer.

In non-alcoholic beverages, as of May 2016, before this declaration, Kirin Beverages had adopted FSC-certified paper for all of its 250-ml drink boxes for the Tropicana 100% range, and was displaying the FSC label on the boxes. After the declaration, it extended the use of FSC-certified paper to its Tropicana 900-ml drink boxes in March 2017, and to its Kirin Gogo-no-Kocha Summer Citrus Tea in May the same year. It continued to progressively adopt it for other products, and at the end of October 2018, it had achieved 100% use of FSC-certified paper for 6-can beverage packs and cardboard cartons for products, and approximately 98% use for drink boxes.

In alcoholic beverages, 100% use of FSC-certified paper for 6-can beer packs of all sizes was achieved by the end of November 2017, and certified paper was adopted for the Kirin Ichiban Shibori Draft Set gift boxes in October the same year. By the end of March 2019, 100% use of FSC-certified paper was achieved for all 6-can beer packs, gift boxes, and cardboard cartons for products, meaning that many of the end-of-2020 targets have been met well ahead of schedule.

FSC-certified paper targets and status of achievement

The status of achievement of targets as of the end of March 2019 is as follows.

FSC-certified paper targets and rate of achievement

Type	Target	Target Year	Rate of FSC-certified paper	Rate of FSC labeling
6-can packs for beer	100%	End of 2017	100%	adout93%
6-can packs for non-alcoholic beverages	100%	End of 2017	adout97%	adout78%
Gift boxes	100%	End of 2020	100%	adout70%
Drink boxes for non-alcoholic beverages	100%	End of 2020	adout98%	adout75%
Drink boxes for alcoholic beverages	100%	End of 2020	adout89%	adout9%
Cardboard cartons for non-alcoholic beverages	100%	End of 2020	100%	adout70%
Cardboard cartons for beer and RTD products	100%	End of 2020	100%	adout60%

For policies on biological resources→P.77

FSC logo displayed on top of 6-can beer packs and cardboard cartons for products

The Kirin Group is pursuing the display of the FSC-certified label to give consumers a real sense of the importance of protecting the forests. In May 2017, we became the first brewery in Japan to sell 6-can packs of beer displaying the FSC-certified label. Since October the same year, we have begun progressively displaying the label on the underside of other 6-can packs and it now appears on the underside of almost all of our 6-can packs. We have also started displaying the label on the spout and sides of drink boxes for non-alcoholic beverages, with the label already visible on almost half of these products.

Further, starting with January 2019 shipments, the FSC logo is being displayed on the top of 6-can packs and cardboard cartons for alcoholic beverages. We plan to display the FSC logo on the top of almost all of these products before the end of the year, so it will be possible to see the logo on most products on store shelves.

Reduce

Corner-cut cartons

Our “corner-cut cartons” were developed by the Research Laboratories for Packaging Technologies and introduced in 2004. The beveled corners have reduced the weight of the carton and, because the carton has eight sides, making it stronger, the cardboard thickness has been reduced, resulting in a 10.9% reduction in the weight of the carton compared to conventional cartons.

Smart-cut cartons

The smart-cut carton, which we introduced in 2015, is based on the corner-cut carton technology. In addition to the reduction in weight, the corners of the long edges at the top of the carton have been cut to fit the space created by the lids of the 204-diameter can, which are smaller than the rest of the can. This has resulted in a 16% weight reduction compared to the corner-cut carton.
The Research Laboratories for Packaging Technologies developed the smart-cut carton in conjunction with a container and packaging manufacturer, with whom the Laboratories have obtained a joint design registration.

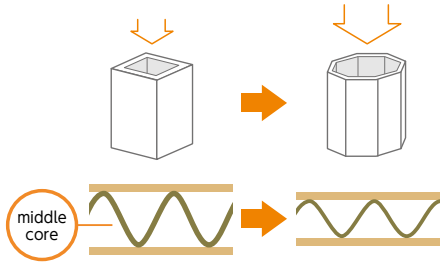
6-can pack

Innovations have been incorporated into various parts of the 6-can pack to make it more lightweight, as well as achieving ease of carrying and removing from the shelf. For example, a new cut-out section has been included at the sides of the pack to match the can edge (Kirin patent), and a “can bottom lock structure” is used to stabilize the bottoms of the can with paper. These innovations have resulted in a reduction in packaging material of 4 grams, or 8%, per 500-ml 6-can pack, while also improving the pack’s can-holding power.

Quantity of paper saved by making cardboard core thinner

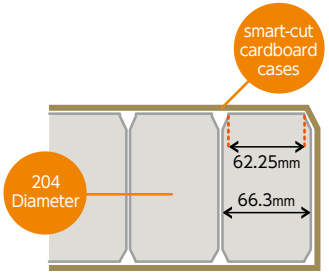
adout 8.9% reduction

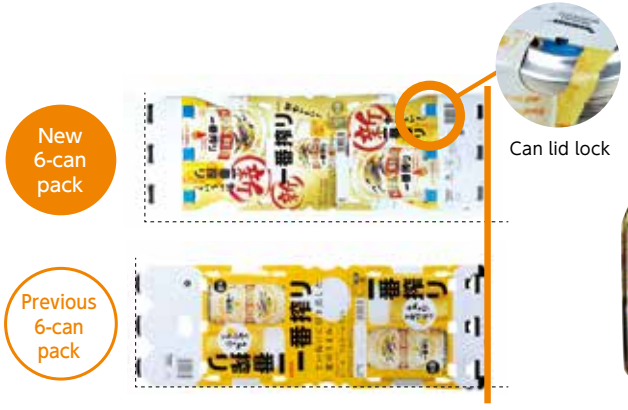
Of the same thickness as well as the corner often becomes resistant to load.

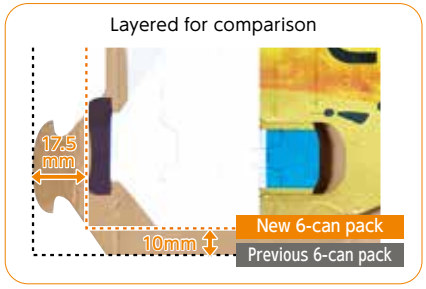


Quantity of paper saved by eliminating corners

adout 2% reduction





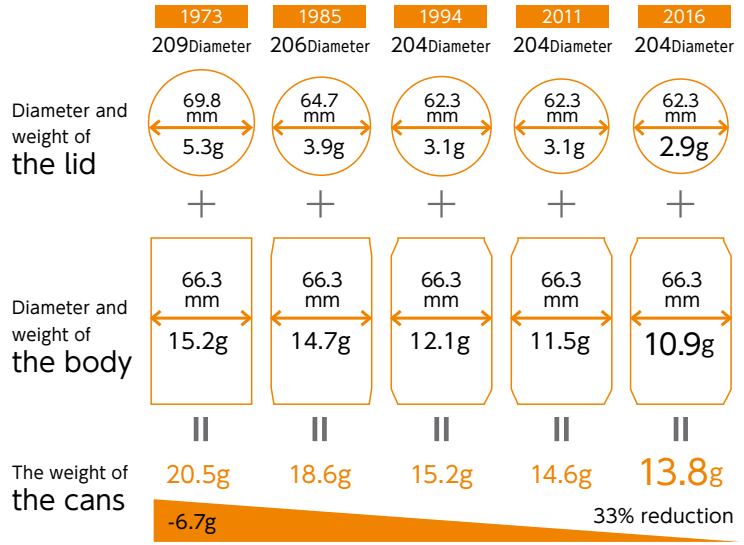


Lighter Cans

At Kirin Brewery, by reducing the diameter of the can ends and narrowing the top and bottom edges of the can body to reduce the weight of the can, as well as thinning out the walls of the can body, for our 350-ml aluminum cans, the current 204-diameter can end has achieved a weight reduction of approximately 29% compared to the old 209-diameter can end. This means an annual saving in aluminum resources* of approximately 19,000 tonnes. (*Kirin data from 2015 production volumes)
Further, working with can manufacturers, we developed Japan's lightest aluminum can with thinner can ends and bodies in 2016. The overall weight of the can has been reduced by approximately 5% (0.8 grams) from 14.6 grams to 13.8 grams. This represents a weight reduction of 33% (6.7 grams) from the 209-diameter can end.

Related Information→P.19

Transitioning weight of the 350 ml aluminum cans



Japan's lightest returnable glass bottles

As well as being light in weight, returnable glass bottles need to be durable enough to maintain their returnable functionality and strong enough to ensure consumer safety and peace of mind.
To meet this challenge, the Research Laboratories for Packaging Technologies made excellent use of innovations such as a ceramic coating that forms a thin film on the bottle's outside surface, an impact-resistant shape design, and a bottle mouth design that meets the conflicting requirements of being easy to open and able to be sealed tightly and that is also strong enough not to chip, achieving Japan's lightest returnable glass beer bottles in all sizes, large, medium, and small.

Related Information→P.19

CO_2 reduction effect of lighter medium-size bottles

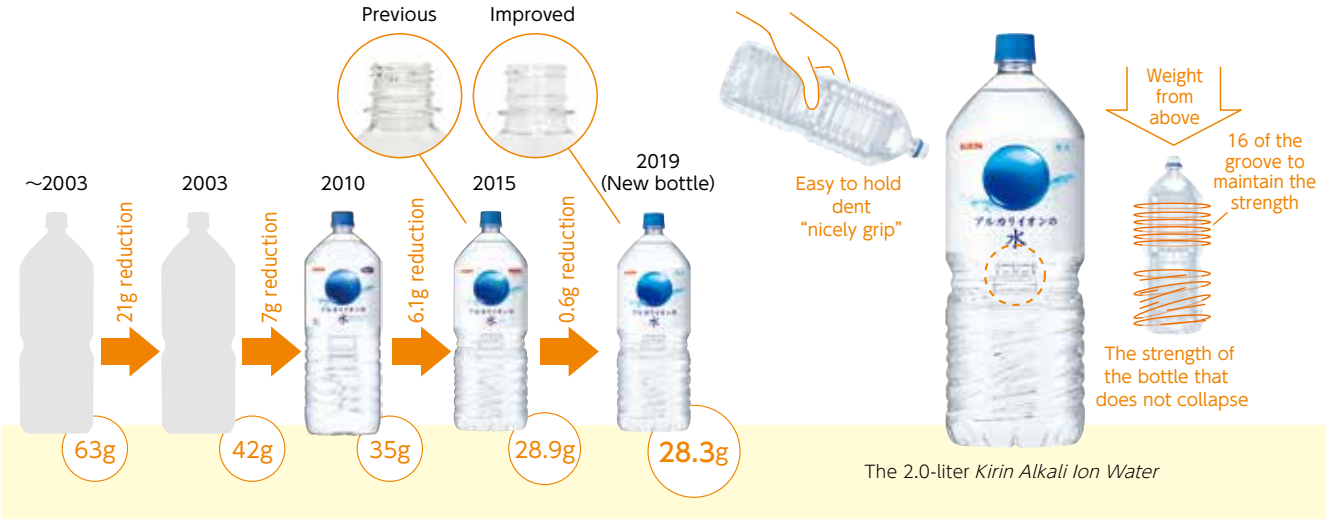
about 930t reduction

※Calculated on assumption of 10 million bottles a year

We applied a ceramics coating technology

One of Japan's lightest PET bottles

The Kirin Group's Research Laboratories for Packaging Technologies have continued their technological development efforts with the aim of reducing the weight of PET bottles. In particular, the weight of the PET bottle for the 2.0-liter Kirin Alkali Ion Water was reduced from 63 grams prior to June 2003 to just 28.9 grams in 2015, with a further reduction to 28.3 grams achieved in 2019, making it the lightest in Japan. Simply making the bottle walls thinner would make it difficult to maintain the strength of the bottle, so a design was developed that achieved both appropriate strength and ease of holding. Innovations were also incorporated that made it easy even for a small child to crush the bottle after the contents have been drunk.
In April 2019, we moved forward with further weight reductions by making modifications to the bottle's screw top, including making the screw threads narrower and the screw portion shorter. These efforts will result in reductions of PET plastic use of approximately 107 tonnes and CO_2 emissions of approximately 375 tonnes.



The 2.0-liter *Kirin Alkali Ion Water*

Other Reduce initiatives

Short-flap carton

The area of the side flap has been reduced to conserve resources. CO_2 emissions during manufacture have been reduced by 10%.

Steel cans

The weight of the can used for *FIRE Hikitate Bito* (low-sugar) coffee was reduced by 23% compared to 2008 in 2012.

Aluminum Cans Laminated Inside and Outside with PET Film

No water is used in the molding process and the elimination of painting inside the can has reduced CO_2 emissions.

Corner-cut cartons

Resource conservation by cutting out the four corners.

The Daily Drinks Co. in Australia has reduced the weight of the shelf-ready packaging for its Zooper Dooper ice candy product by 40%.

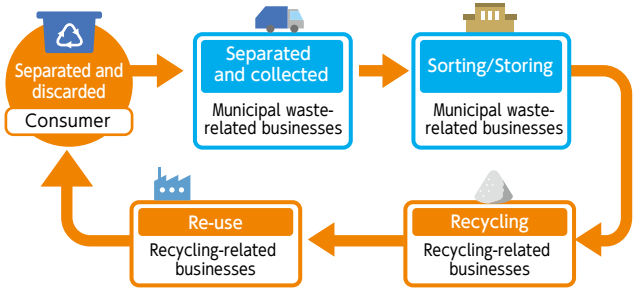
In 2016, Lion Pty Limited also succeeded in reducing the weight of its one-way bottles from 205 grams to 190 grams.

Recycling

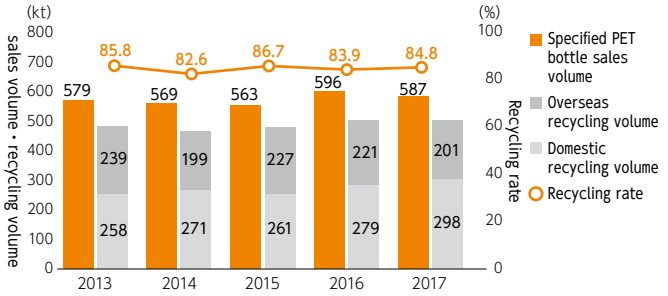
Recycling of PET bottles

The Kirin Group promotes the recycling of PET bottles as a member of the Council for PET Bottle Recycling. Under the Council's Third 3R Promotion Voluntary Action Plan (FY2016-FY2020), we are working toward a target recycling rate of 85% (base year: FY2004).

Flow of recycling of PET bottles



Rate of PET bottle recycling in Japan



Source: The Council for PET Bottle Recycling

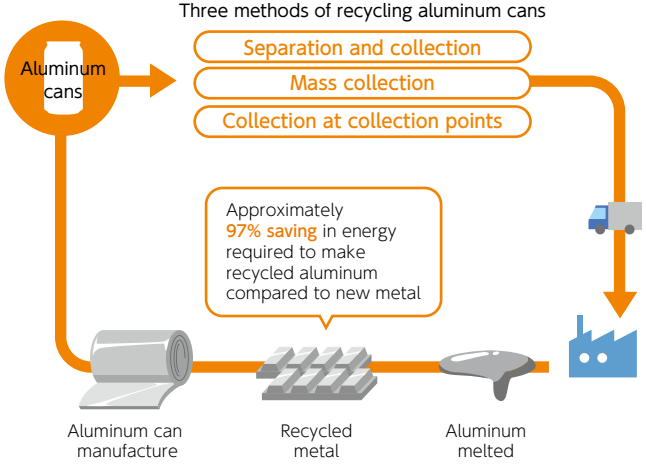
Recycling of cans

The Kirin Group is pursuing the adoption of aluminum cans, which have a high rate of recycled metal. We have also joined the Japan Aluminum Can Recycling Association, and we are providing assistance for the collection of used aluminum cans as a way to promote their recycling. Under the Third 3R Promotion Voluntary Action Plan (FY2016-FY2020) of Japan Aluminum Can Recycling Association and Japan Steel Can Recycling Association, we are working toward a target recycling rate of 90% (base year: FY2004) for both aluminum and steel cans.

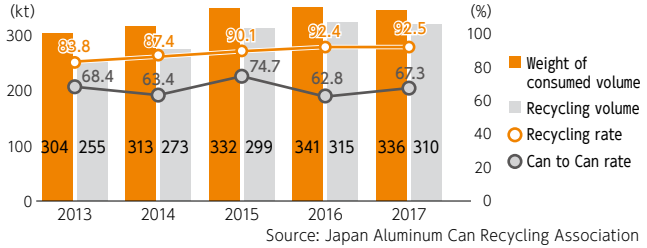
Empty aluminum cans that have been discarded at the breweries are recycled by the can manufacturers and used entirely for aluminum beer cans.

Related Information→P.50

CAN-to-CAN flow

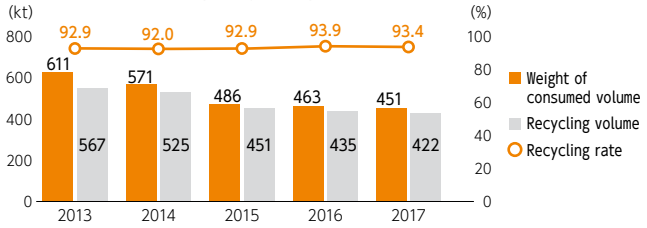


Rate of aluminum can recycling in Japan



Source: Japan Aluminum Can Recycling Association

Rate of steel can recycling in Japan



Source: Japan Steel Can Recycling Association

Recycling of glass bottles

Old returnable glass beer bottles that can no longer be re-used and one-way bottles which are used only once are turned into cullet, for use primarily as the raw material for making new glass bottles.
With the aim of the 100% recycling of empty glass bottles, we are pursuing uses for cullet made from colored glass, which cannot easily be re-used for glass bottles. We are finding other applications for colored cullet, including in building materials such as tiles and blocks and road paving materials.

Other Recycling initiatives

PET bottles

Clear PET bottles used for easier recycling.

Drink boxes

Clear outer-packaging film reduced for easier recycling.

Aluminum cans

Cans with a high percentage of recycled metal used as much as possible.

Outer case cartons

Cardboard suitable for recycling.

TOPICS

Containers and Packaging: Packaging recycled content baseline

Product packaging is a highly material environmental issue for both Lion and its consumers. Lion has been highly engaged with local industry and government to be a part of the solution in moving toward a circular economy and advocating sustainable low-cost, environmentally-friendly outcomes.

Over 90% of Lion packaging materials are already recyclable through existing collection schemes, and Lion are on track to make this 100% by 2025. Lion has recently become a partner of REDcycle, a soft plastics collection system available at major Australian supermarkets. The REDcycle logo will be displayed on the shrink wrap of our classic beer brands from mid-2019. Lion Dairy and Drinks are in the process of adding the new Australasian Recycling Label to their products, which are simple instructions for consumers to follow for disposing of packaging.

Lion also has targets to achieve an average 50% recycled content across its packaging materials by 2025. Currently, Lion packaging materials contain over 40% recycled content, by weight. Glass, aluminium, steel, paper and board contain the greatest amounts of recycled content, which are the materials Lion use the most by weight. Materials with little to no recycled content include most plastics, multi-laminate materials and wet strength board. Lion Dairy and Drinks have recently achieved the addition of 25% recycled content into PET white milk bottles at all milk plants, and 20% recycled content into HDPE white milk bottles at two milk plants. Milk products containing recycled PET and HDPE were launched into the marketplace in early 2019.

Lion have also reviewed opportunities for removing or reducing the amount of packaging used. Changes implemented during the year include light weighting 2 liter and 3 liter milk bottles, saving approximately 700 tonnes of HDPE per year. Lion were also able to achieve a 25% reduction in glue for cartons, and recently removed the paper neck label on Summer Bright beer bottles.

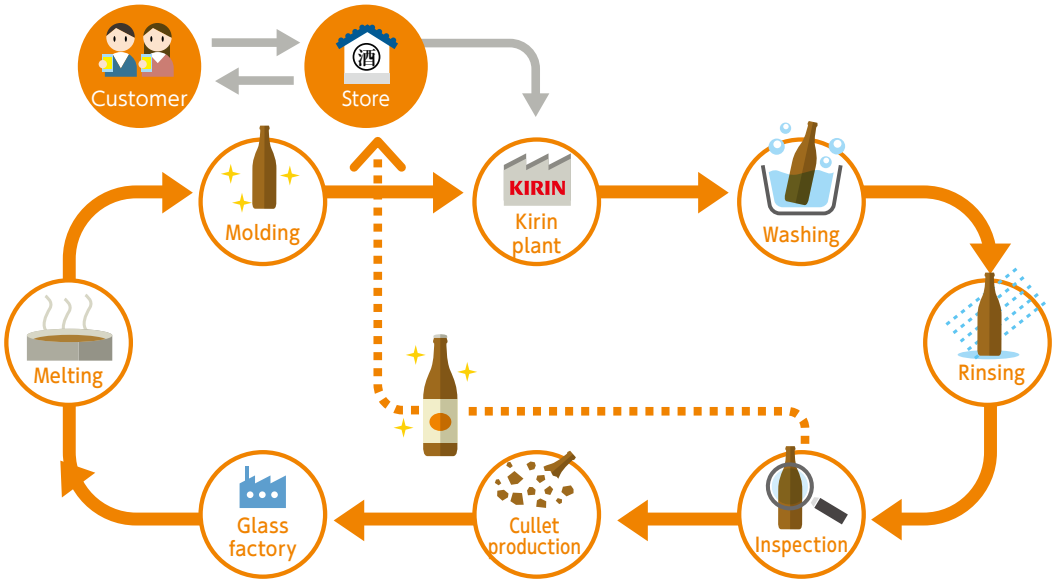
Additional projects planned for 2019 will produce the following savings per year on an ongoing basis

Glass	Shrink film	Stretch wrap	HDPE
800t reduction	10% reduction	43% reduction	700t reduction

Reuse

Re-use of glass bottles

In Japan, glass bottles have been collected and re-used over and over since the Meiji Era (1868-1912), long before the word “3R” was coined.
Returnable glass bottles that come back to the factory are washed thoroughly inside and out to make them as clean as a new bottle. After the bottles are stringently checked for scratches and cracks with an empty bottle inspection machine, they are put back into product service and filled with beer. When handled carefully, returnable glass bottles last for an average of about eight years. This means they are used around 24 times.
Bottles that have small scratches or fine cracks or that are too old to be of service any longer are crushed and turned into a material called cullet, which is used as the raw material to make new bottles.



For Kirin Brewery and Kirin Beverage returnable bottle collection rates→P.52

Other Reuse initiatives

Returnable bottle (alcoholic beverages)

Returnable bottle (soft drinks)

Large commercial draft barrels (stainless steel)

With the Society

Consumer awareness stickers affixed to empty container recycling boxes for vending machines

The Japan Soft Drink Association, of which Kirin Beverages is a member, issued a Soft Drink Business Plastic Resource Reclamation Declaration on November 29, 2018.
As one of the initiatives under this declaration, from May 2019, the Association rolled out a campaign to attach 500,000 stickers to the empty container recycling boxes placed next to vending machine, to make consumers aware that these boxes are solely for the collection of empty containers for recycling purposes. The soft drinks industry aims to reduce any contaminants from the PET bottle recycling chain to ensure that 100% of the bottles can be used effectively.

Voluntary collection of aluminum cans

As a member of the Japan Aluminum Can Recycling Association, the Kirin Group is engaged in the recycling of aluminum cans. In addition, it also supports the activities of can manufacturers to collect used cans. More than 500 tonnes of aluminum cans are collected via these activities, all of which are recycled back into new cans, which Kirin uses for its products.

Bags for recycling provided by Kirin Brewery

Collection of used containers at vending machines

For vending machines installed by Kirin Beverage, the company conducts a comprehensive operation, from proposal and refilling of merchandise to service and repair of the vending machines. In addition, as an environmental initiative, it collects the empty containers and even cleans the area around the vending machines.

Easily separated containers and packaging

In consideration of ease of trash separation, we endeavor as far as possible to use single materials in our containers and packaging or make it easier to separate them into single materials. Also, to raise awareness about the recycling of containers and packaging, we provide containers and packaging that are easy to separate. We also take into consideration the ability to recycle the materials without problems at general waste processing facilities.

Consumer awareness activities

We are engaged in a number of 3R awareness-raising activities on the internet. These include the Kirin's Containers and Packaging and 3R website, which is the most informative website about recycling in the industry, and the Beverage Kids website for children. We also deal with the theme of 3R for containers and packaging at our Kirin School Challenge workshops for children.
We also use Eco Panda, an environmental-awareness mascot character that made its first appearance to coincide with the launch of the "pecology bottle," an environmentally-friendly, resource-conserving, easily crushable container, to conduct awareness-raising activities aimed at children.
We have also conducted awareness-raising activities at a variety of events, including exhibiting our R100 PET Bottle for the Kirin Nama-cha Decaf which used 100% recycled PET plastic, and our Japan's-lightest 2.0-liter PET bottle used for Kirin Alkali Ion Water at the G20 Innovation Exhibition and PR for International Media Center (IMC) during the G20 Osaka Summit.

Kirin's Containers and Packaging and 3R
https://www.kirin.co.jp/csv/eco/special/recycle/

KIRIN KIDS
https://www.kirin.co.jp/entertainment/kids/

Kirin School Challenge

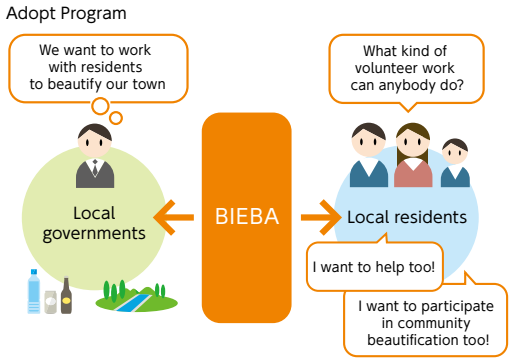
G20 Innovation Exhibition

Australia's Container Deposit Schemes and Lion's Initiatives

Australia now has Container Deposit Schemes (CDS) established in five of its eight states and territories. CDS is operational in the following states and territories; South Australia (SA), established in 1977, Northern Territory (NT) established in 2012, New South Wales (NSW) implemented in December 2017, Australian Capital Territory (ACT) implemented in June 2018 and Queensland (QLD) implemented in November 2018. All scheme's offer a 10-cent refund per container. Western Australia (WA) is introducing a Container Deposit Scheme to commence in early 2020.
In New South Wales, Australia's most populated state, there are 648 collection sites available. Collection sites include reverse vending machines, over the counter sites, automated depots and donation stations. Over 1,633 million drink containers have been returned in the first 15 months of operation. Queensland has 230 container collection sites and have seen over 344 million containers returned in the first 5 months of operation. In the Northern Territory, container return rates have risen to 75%, up from 48% in the previous year, and a significant increase from less than 30% prior to the scheme's introduction in 2012. South Australia, the longest running Container Deposit Scheme, has consistent return rates of nearly 77%, with 132 collection sites. This is the equivalent of 603 million beverage containers collected per year, or 42,913 tonnes of packaging recovered for recycling.
Lion plays an active role in Australia's Container Deposit Schemes, holding majority ownership of Marine Stores, a Recovery Coordinator in South Australia and the Northern Territory. Lion is also a part of the joint venture which coordinates the NSW Container Deposit Scheme, Exchange for Change (EfC). In Queensland, Lion is a member of the Container Exchange Limited (CoEx), appointed as the Product Responsibility Organisation to administer and run the Queensland scheme.
Whilst there are inter-jurisdictional working groups established to ensure alignment and consistency across the various Container Deposit Schemes in Australia, there is still a strong desire for a nationally coordinated scheme.

Adopt Program (Community Beautification)

The Adopt Program is a method of community beautification in which residents "adopt" a section of a neighborhood and participate in cleanup activities. The Beverage Industry Environment Beautification Association (BIEBA) brings together six beverage manufacturing industry bodies to conduct promotions and activities aimed at the beautification of communities. Kirin Brewery and Kirin Beverage participate in BIEBA as members of their respective industry bodies, the Brewers Association of Japan and the Japan Soft Drink Association, providing support for activities in this Program.



Main activities of the Beverage Industry Environment Beautification Association

Support for education

BIEBA grants awards to schools that are actively engaged in the education and practice of community beautification. It also produces and supplies community beautification education guides for teachers.

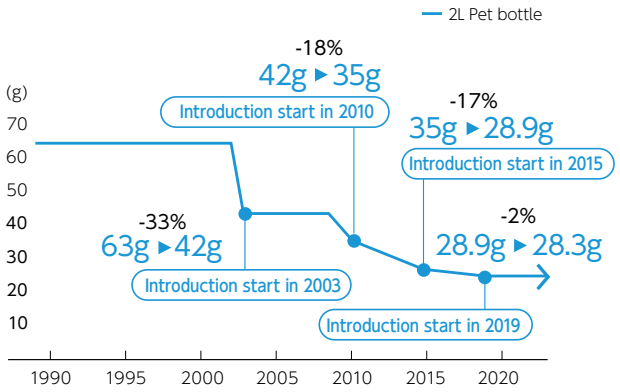
Littering prevention campaign

BIEBA places "No Littering" stickers on roadside signs and vending machines to call for the prevention of littering.

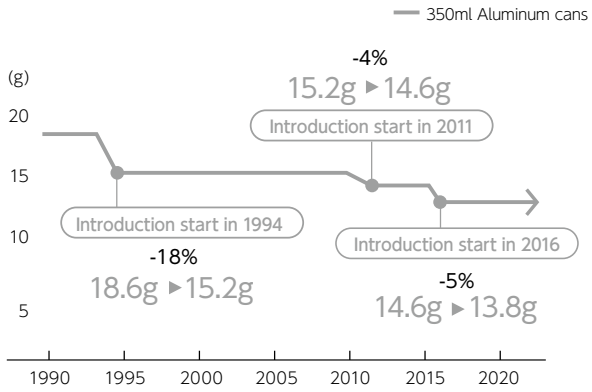
Graphs for Containers and Packaging

Related Information→P.87～88

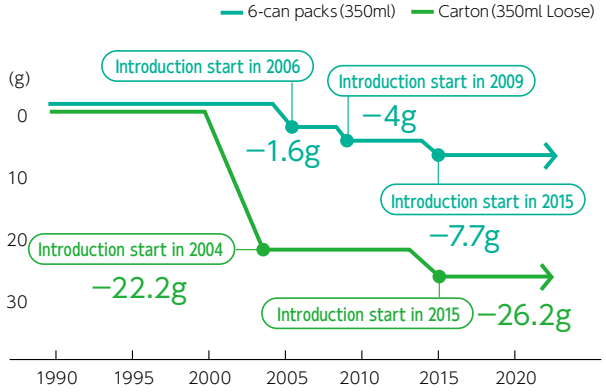
PET bottles lighter transition



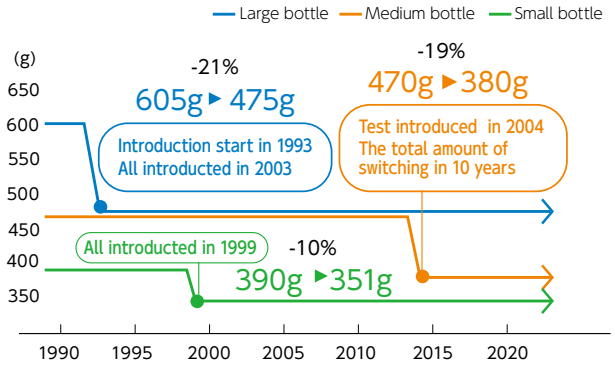
Can lighter transition



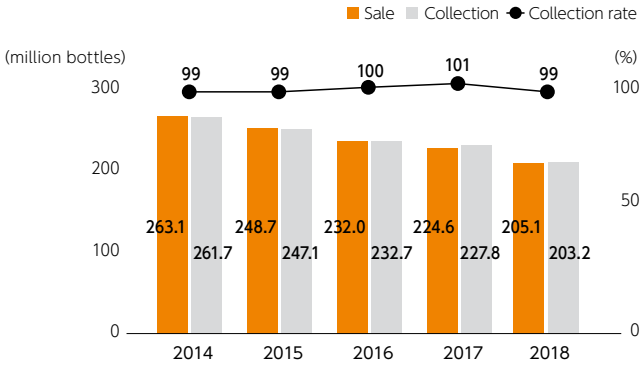
Trends in weight reduction of cartons and 6-can packs.



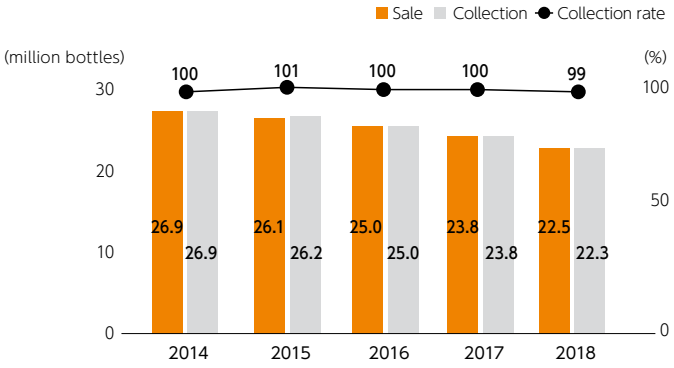
Returnable beer bottles lighter transition



Kirin Brewery trends in sale and collection of returnable glass bottles



Kirin Beverage trends in sale and collection of returnable glass bottles



TOPICS

Research Laboratories for Packaging Technologies

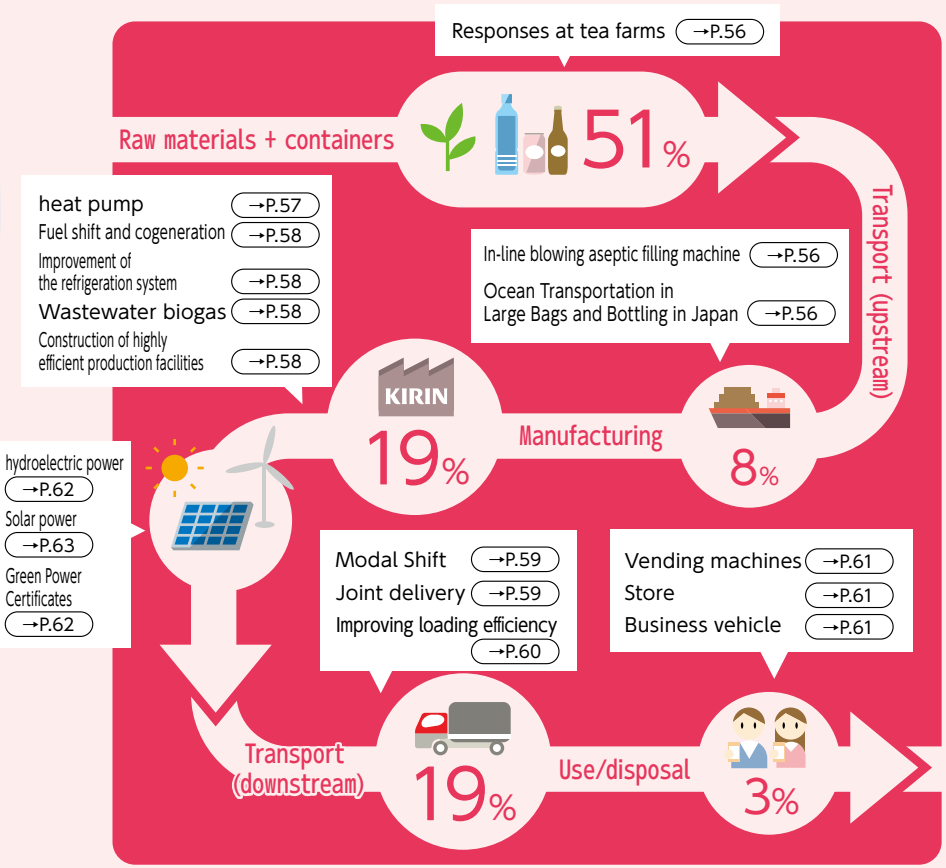
The Research Laboratories for Packaging Technologies develop and evaluate technologies related to packaging lines and packaging and containers used in the Kirin Group's alcoholic and non-alcoholic beverages businesses. The Research Laboratories is one of the few research laboratories owned by a Japanese beverage company for the development of packaging and containers for the company's own use. It leverages the technologies it has accumulated in areas such as glass bottles, cans, PET bottles, cardboard cartons, and other paper packaging over many years to provide the necessary technical assistance to bring products to market. It promotes the creation of technical "seeds" that will enrich our customers and society through new packaging and containers.
The Laboratory is as well equipped as a small factory, with machinery to fill glass bottles and aluminum cans with beer and equipment to attach labels to bottles.

Grobal Warming

Basic Thinking

Climate change caused by global warming has a major impact on biological and water resources, which are important raw materials for the Kirin Group. The 2° C target of the Paris Agreement is an equal responsibility for all companies. To that end, in 2009, the Kirin Group declared the goal of halving its GHG emissions from a 1990 base-year across the value chain by 2050, which was lofty for the time, and has been taking action toward that target. We are also working on information disclosure in line with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).

Ratios of greenhouse gas emissions in value chain



Overview of Approaches

In 2009, the Kirin Group declared the lofty target of halving our CO_2 emissions from a 1990 base-year across the value chain by 2050 and we have been taking action toward that target. In 2017, we further set a new greenhouse gas (GHG) reduction target for total of Scope 1 and Scope 2 emissions and Scope 3 emissions by 30% from a 2015 base-year by 2030. This target was approved by the international initiative, Science Based Targets (SBT), as a science-based GHG reduction target aimed at keeping the rise in global temperatures to less than 2° C above pre-industrial revolution levels. This was the first example of such approval in Japan's food industry.
Upstream in our value chain, we have brought the production of PET bottles in-house and started bottling wine imported from overseas in Japan. In the manufacturing area, in addition to the introduction of fuel conversion and co-generation, we have also started installing new heat pump systems in all Kirin Brewery breweries. We are also actively working on reducing our GHG emissions in the logistics area with initiatives such as joint deliveries and modal shift.
We are also actively pursuing the use of natural energies, including the use of CO_2-free electricity derived from hydroelectric power, the introduction of Green Heat and Green Power Certificates, and the planned installation of a large-scale solar power generation system at a brewery in Brisbane, Australia.
In 2018, we became the first company in Japan's food industry to support the TCFD recommendations, and we are working on information disclosure in line with those recommendations.

Related Information→P.88～92

Highlights of Outcomes

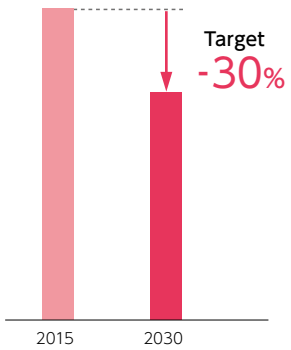
Challenges	Progress
Promoting reduction of GHG emissions	In addition to conventional energy-saving measures, we have also started installing heat pump systems in our breweries. We are also actively working on the reduction of GHG emissions in the logistics area, including commencing joint deliveries on beer pallets. In 2018, we achieved a 3.8% reduction in Scope 1 + Scope 2 GHG emissions compared to 2015, and a 10.2% reduction in Scope 3 emissions.
Promoting the introduction of renewable energies	Our ratio of renewable energy in power purchased by the breweries in Kirin Brewery is now 29%. We are also planning to install a new large-scale solar power generation system in the Castlemaine Perkins Brewery, the iconic Brisbane brewery in Australia.
Participation in international initiatives	In a first for Japan's food industry, our GHG reduction targets were approved by the SBT initiative as science-based targets aimed at keeping the rise in global temperatures to less than 2° C above pre-industrial revolution levels. We were also the first in the industry in Japan to declare our support for the Task Force on Climate-related Financial Disclosures (TCFD).

TCFD — Kirin Holdings was the first Japanese food company to support the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD).

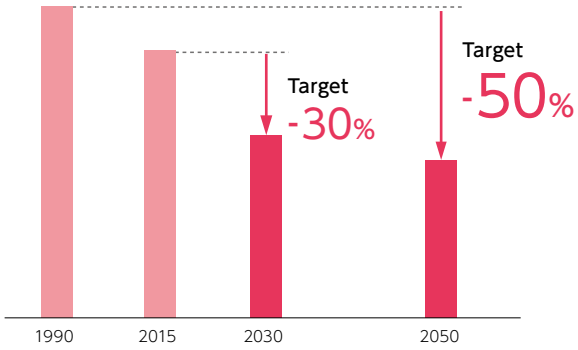
SCIENCE BASED TARGETS — The Kirin Group's medium-term GHG reduction targets have been approved by the Science Based Targets (SBT) initiative, the first Japanese food company to receive this approval.

Target

Target for total Scope 1 and Scope 2 emissions

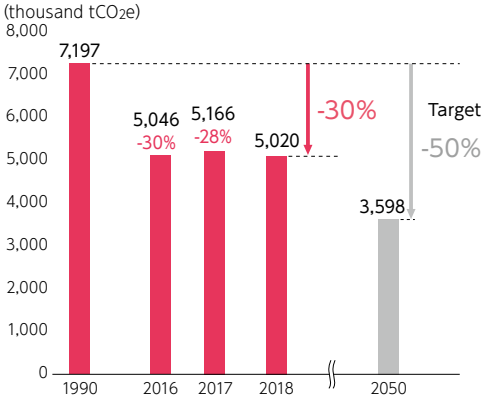


Greenhouse gas emissions across value chain and reduction targets

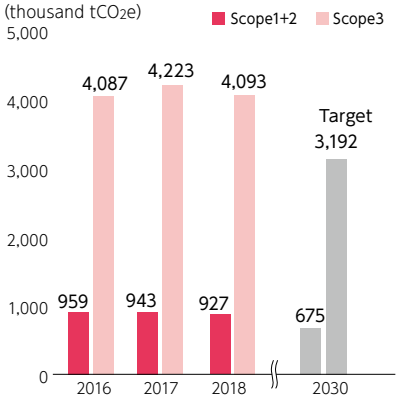


Progress

Trends in greenhouse gas emissions from entire value chain



Trends against medium-term greenhouse gas emissions reduction targets



Value chain upstream

Responses at tea farms

At the tea farms in Sri Lanka, in recent years, they have unusual heavy rainfall in the rainy season more frequently due to the effects of climate change. In the key tea production region of Uva Province, many human lives were lost due to landslides. In the training for Rainforest Alliance certification, farmers are taught how to prevent fertile soil from being washed away by erosion caused by rain. Specifically, they are taught to plant grasses whose roots sink deep into the soil and crawl the ground on slopes. In addition to preventing landslide disasters caused by heavy rainfall, this also serves as a response to the problem of climate change.

Related Information→P.24

In-line blowing aseptic filling machine

An in-line blowing aseptic filling machine forms PET bottles from materials known as preforms and fills bottles under aseptic conditions. Kirin Beverage introduced Japan's first in-line PET blowing aseptic filling machine to Nagano Tomato (currently Shinshu Beverage) in 1997, and subsequently installed a high speed in-line PET blowing aseptic filling machine at the Shonan Plant in 2000.
Although installation of the machine increases CO_2 emissions from the plant, using preforms allows us to process greater loads on trucks compared to using empty PET bottles; therefore, it significantly enhances transport efficiency. Installation consequently contributes greatly to reducing CO_2 emissions from the value chain as a whole and to cutting costs. Furthermore, in 2003, we installed a preform molding equipment on the beverage manufacturing line at Kirin Distillery ahead of other players in the industry.

Ocean Transportation in Large Bags and Bottling in Japan

Mercian ships some of the wine it imports via ocean transportation in specially designed, large 24 kiloliter bags (equivalent to about 32,000 750 liter bottles) with low oxygen permeability and bottles the wine in Japan. Compared to importing bottled wine, this method lets Mercian reduce CO_2 emissions during ocean transport by roughly 60%. In addition, bottling wine in Japan allows us to use Ecology Bottles (made with at least 90% recycled glass) and lightweight bottles, which contributes to making effective use of resources and reducing CO_2 emissions during shipment within Japan.

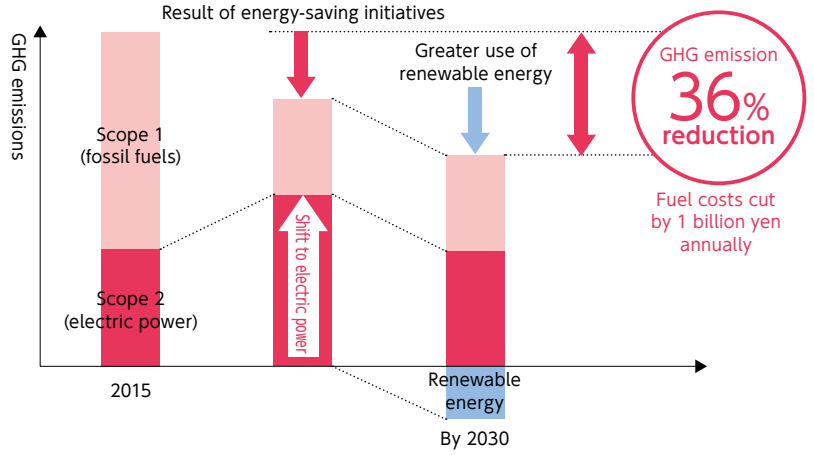

Specially designed large bags

Manufacturing

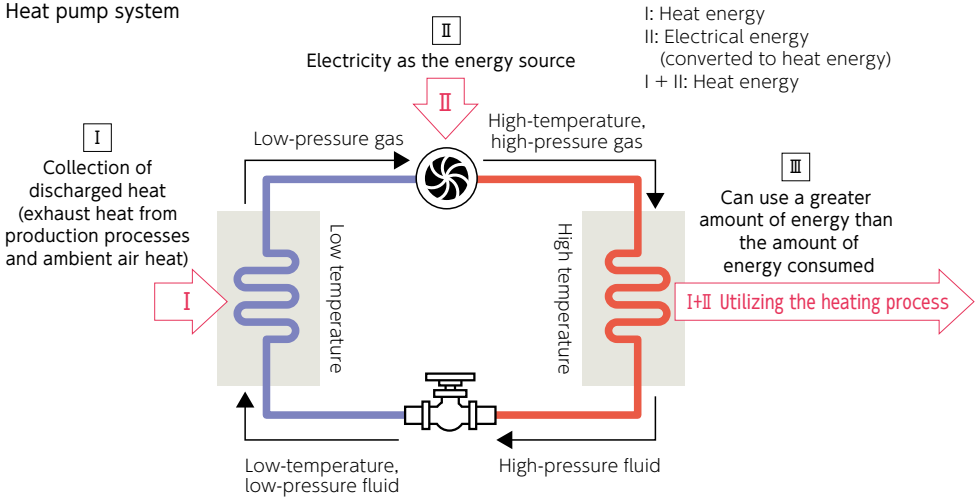
GHG reduction initiatives in manufacturing processes

Kirin Brewery reduced its GHG emissions by about 70% over a 25-year period from 1990 to 2015 by applying its leading technological capabilities in the global beer industry and carrying out numerous forward-looking initiatives.
Now the company is taking on the challenge of applying even more technological innovations to achieve GHG emission reduction targets set by the Kirin Group in 2017.
As a means to achieve this, we are aiming to shift our energy sources from fossil fuels to electric power. Both electric power and fossil fuels are currently used as energy sources at our breweries. Comparatively, the largest amount of GHG emissions comes from fossil fuels, which are used to generate heat. Therefore, in order to reduce GHG emissions, we need to improve energy efficiency and reduce the amount of energy consumption. At the same time, we believe that shifting the energy mix to electric power, and, furthermore, using electricity generated by renewable energy sources are the most effective ways of reducing GHG emissions.
Heat pump systems are a key technology for reducing GHG emissions. We have been able to both save energy and shift to electric power by installing heat pump systems. Simply installing equipment, however, will not necessarily produce results. Before installation, it is essential to analyze the entire heat flow of the production process and optimize it through advanced designs. The Kirin Group has accumulated leading engineering capabilities, and my team made use of that experience while aiming to put in place a production system that realizes the world's lowest amount of GHG emissions. Through these efforts, we expect to reach our GHG emission reduction target before 2030. Moreover, reducing annual energy costs by 1 billion yen appears to be achievable.
While monitoring results at the Okayama Factory and using it as a model, we plan to successively replace the energy systems at each of our other factories in Japan and abroad from 2019.
Kirin Brewery will continue applying its technological strengths with a view to realize the world's best energy system.

Method of reducing GHG emissions



Heat pump system



Fuel shift and cogeneration

A significant proportion of the fuel used in breweries is used in the boilers that generate steam. We have shifted to natural gas, which generates less CO_2 than heavy oil. This fuel shift has been completed in all of Kirin Brewery's and Kirin Beverage's manufacturing plants. We are also achieving more efficient boiler operations through the installation of small boilers. We have introduced cogeneration systems to provide some of the plants' heat and electricity.

cogeneration

Improvement of the refrigeration system

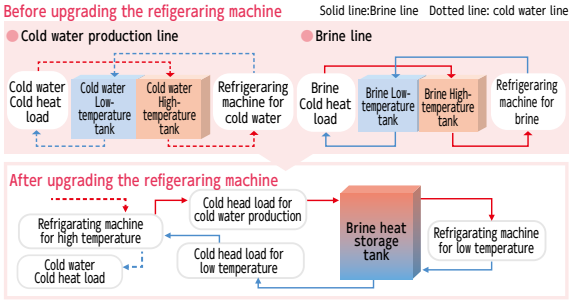
At some of the plants of Kirin Brewery and Kirin Beverage, energy-saving efforts are made through improving the efficiency of refrigerating systems. This is done by implementing a cascade refrigeration system, which cools in phases in a process that involves a considerable temperature difference, or making operational improvements.

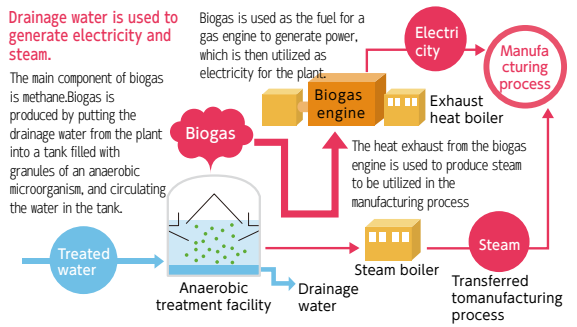
Wastewater biogas

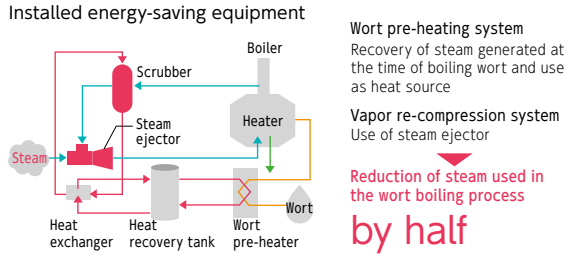
In our beer breweries, we have introduced anaerobic treatment facilities to purify the wastewater generated by the manufacturing process. Unlike conventional aerobic treatment, anaerobic treatment does not require electricity for ventilation. Also, the anaerobic microorganisms generate biogas as a by-product of the treatment process. This biogas, the main component of which is methane, can be used in biogas boilers and cogeneration systems. Derived from biological materials such as malt, biogas is a renewable energy and a CO2-free fuel.

Construction of highly efficient production facilities at Myanmar Brewery

To meet skyrocketing demand, Myanmar Brewery has made major expansions at its manufacturing and filling facilities. Its high-efficiency 100,000 KL line began operation in the beginning of 2018. From the overall design to equipment selection, installation, tuning and other work for the new facilities, we assist Myanmar Brewery which seeks maximization of investment efficiency by leveraging the experience and high level skills of Kirin Engineering, which has an excellent reputation even with food manufacturers outside the group, and engineers temporarily assigned from Kirin. Currently, with the rapid economic development in Myanmar, there are concerns about tightening of the energy supply-demand balance in the future.
Against this background, we are curbing energy consumption in the various processes, such as taking advantage of the Japanese Government's Joint Crediting Mechanism (JCM) financial assistance scheme to introduce the latest energy-saving equipment. In this way, the Kirin Group aims to achieve sustainable growth in Myanmar while contributing to both Myanmar's economic growth and the reduction of its environmental footprint.







Distribution

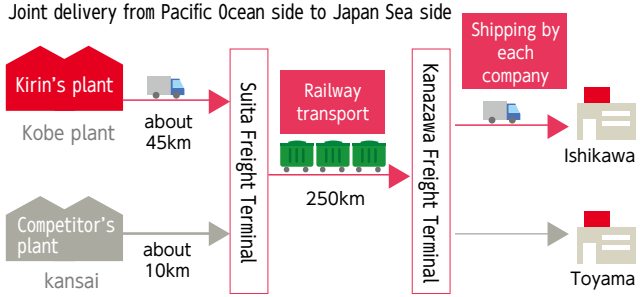
Promoting Modal Shift in Transportation of Goods

The Kirin Group promotes rail freight with lower CO_2 emissions. Kirin Beverage and Kirin Brewery became certified with the Eco Rail Mark for their extensive use of rail freight in 2006 and in 2010, respectively. Furthermore, Kirin Beverage has switched from truck transport to rail container freight for mid-to long-distance shipments (400 to 500 km or more) and has adopted a utility model of special cartons it has developed that are less likely to rub together during long-distance shipments. These are just some of the ways we are working to reduce CO_2 emissions and maintain and improve quality during shipping.

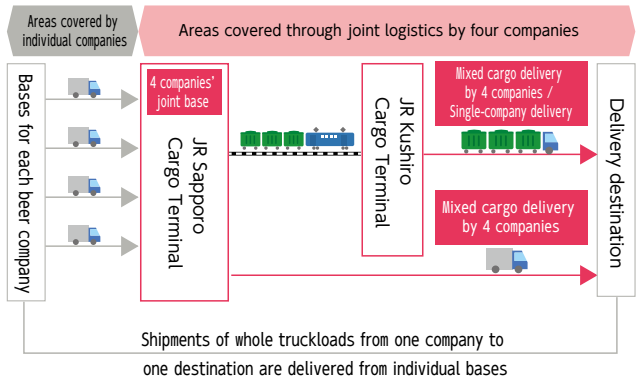
Joint delivery

The Kirin Group has positioned the logistics area as a non-competitive sector and is actively engaging in initiatives in this area.
In 2017, together with other companies in the industry, we established a joint delivery center in Kanazawa City, Ishikawa Prefecture, and launched joint transport by rail container from plants in the Kansai area. Neither of the companies has manufacturing plants on the Japan Sea side, so products had to be transported by truck over long distances - of 200 km - from their plants on the Pacific Ocean side. This was inefficient and placed a great burden on the truck drivers. Joint transportation using rail containers has not only significantly reduced CO_2 emissions but also shortened distances between the plants and the terminals and between the terminals and the destinations with a significant alleviation of driver's burden, which is helping to solve the social issue of truck driver shortage. A similar initiative has also been launched by the four large brewing companies in Hokkaido.

Joint delivery from Pacific Ocean side to Japan Sea side



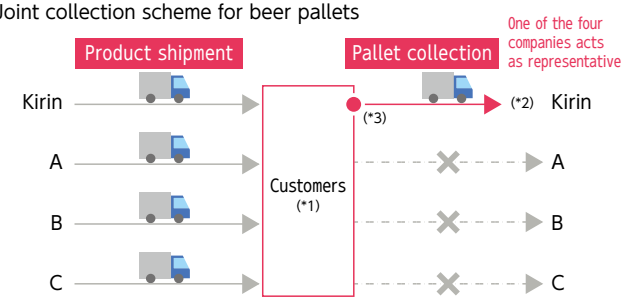
Joint delivery in Hokkaido



Joint collection of beer pallets

In a joint initiative by the Japan's four major breweries, we are expanding the joint collection of beer pallets.
The joint collection of beer pallets began in the Tohoku area in November 2018 and has been expanded to the Tokyo metropolitan, Tokai, and Kyushu areas from July 2019. It will be progressively expanded to other areas from November 2019 until it becomes a nationwide initiative. Against a background of labor shortages in the logistics area, including a shortage of drivers for truck transport, the aims of the joint beer pallet collection initiative are to reduce our environmental footprint through streamlining of logistics and to alleviate the operational burdens of both the manufacturers and their customers.
With the area expansion in July, improvements in loading efficiency for collection vehicles and shorter collection distances have promoted further reductions in CO_2 emissions. It is estimated that this will result in an annual reduction in total CO_2 emissions by the four breweries of approximately 4,778 tonnes (approximately 47% compared to usual emissions).

Joint collection scheme for beer pallets

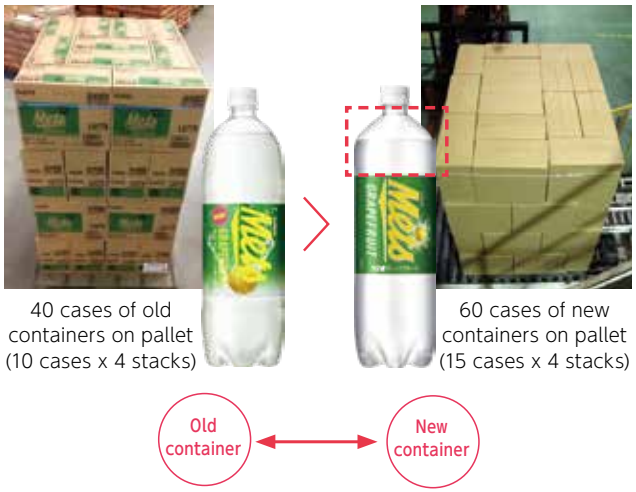


*1 Restricted to customers that have dealings with multiple companies and a transaction scale of at least a certain level (total of around 10,000 beer pallets a year from members of the Association for Joint Use of Beer Pallets)
*2 One company will represent the four beer companies and collect the pallets. None of the other companies will collect them.
*3 The representative will tally up the pallets of the four beer companies and manage the collection with the customer.

Improving loading efficiency

Using a truck allocation system that has master data for the precise loading capacities of each truck, the Kirin Group is working to transport our products with the most efficient combinations of trucks and cargo.
Further, Kirin Beverage compensated the capacity reduction for large carbonated drink containers (1.5 L) by changing its shoulder shape and changed the body diameter of the PET bottles from 92.5 mm to 89.5 mm. This means that the number of cases loaded on one pallet has been increased from 40 (10 cases x 4 stacks) to 60 (15 cases x 4 stacks), improving the loading efficiency to 1.5 times.
In 2018 results, we achieved a 16% reduction* in the number of trucks used to ship large carbonated drink containers.

* Calculated from large carbonated drink container actual shipments in 2016.

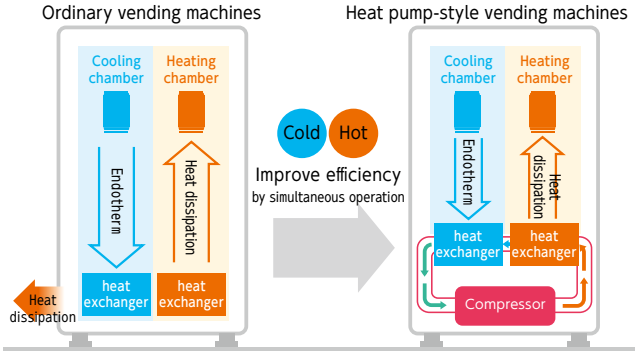


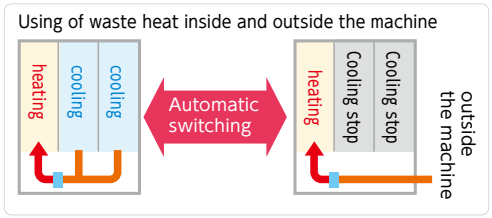
Sale

Vending machines

Heat pump-style vending machines pump up the waste heat generated when cooling products and use it for heating to warm up the products. This allows reduction in power consumption compared to conventional vending machines by cutting down the power used by the heaters.
Kirin Beverage was the first in the industry to introduce heat pump-style vending machines in 2006, and from 2012, almost all newly installed vending machines for cans and PET bottles are of this type. As of April 2019, more than 80% of installed vending machines have been switched to this type.
The latest heat pump-style vending machines are equipped with a compressor that uses an inverter to delicately control the operation (variable speed of rotation) according to the atmospheric temperature and the temperature of the products in the machine. Further, some types offer higher energy-saving performance, such as with heating functions not only by using the waste heat released by the cooling chamber as previous models did, but also by capturing the heat from outside the machine, and by improving hot and cold insulation performances with the heavy use of vacuum insulation materials. These vending machines have evolved to the point where power consumption can be reduced by about 40% compared to 2013. Installation of the new models began in 2015, and we are aiming for 70% of new machines installed in 2019 to be new models.

About heat pump

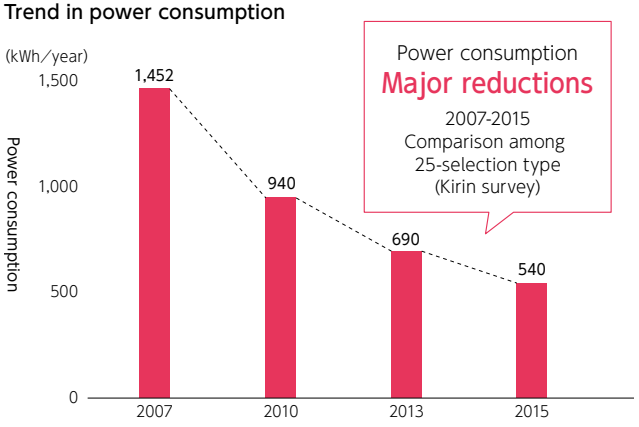




LED lighting

Conventional fluorescent lighting is being replaced with high energy-saving LED lighting to reduce power consumption and achieve energy conservation.

Trend in power consumption



SPRING VALLEY BREWERY TOKYO

SPRING VALLEY BREWERY TOKYO is an all-day dining establishment that opened in Log Road Daikanyama in April 2015, where patrons can enjoy craft beer made on premises. 100% of the restaurant's electricity needs are met by green power* using Green Power Certificates issued by the Yokohama City Wind Power Generation Project.

Related Information→P.62

SPRING VALLEY BREWERY TOKYO, where patrons can enjoy craft beer

Switching commercial vehicles to hybrid cars

Kyowa Kirin is proceeding with switching commercial vehicles to hybrid cars. The company started serially switching from the conventional certified low emission vehicles in 2009, and by the end of FY 2018, introduction rate of hybrid cars of its company-owned vehicles reached 91.8%. By cutting back fuel used in sales activities in this way, the company is achieving reductions in CO_2 emissions.

Natural energy

Natural energy introduction targets

Kirin Brewery has set a target of increasing the ratio of renewable energy in the power purchased at its plants by 50% in 2030 compared to 2015 and has started taking action to achieve that.
Lion has also set a new target of reducing its carbon emissions by 10ktCO_2e by 2026 by installing solar panels on its own premises. In this plan, solar panels with a generating capacity of 4MW will be erected by 2020, increasing to 10MW by 2026.

Ratio of renewable energy in purchased power at plants

2018 29%

CO_2-free hydroelectric power

Since April 2017, Kirin Brewery's Toride Plant and Kirin Beverage's Shonan Plant started using CO_2-free hydroelectric power in a portion of purchased power. The plants are taking advantage of Aqua Premium, the Japan-first option offered by TEPCO Energy Partner to supply only hydroelectric power. By using hydro-electric power, which does not emit CO_2 at the time of power generation, they will contribute to global warming countermeasures. This is the first example of the use of this option by any factory in Japan, not just in the food and beverages industry. In 2018 results, CO_2-free hydroelectric power accounted for approximately 70% of purchased power at the Toride Plant and approximately 34% at the Shonan Plant.

Kirin Beverage Shonan Plant

Ratio of hydro-electric power Approx 34%

Kirin Brewery Toride Plant

Ratio of hydro-electric power Approx 70%

Green Heat and Green Power Certificates

The Kirin Group has started the introduction of the Green Heat Certificate at Kirin Brewery's Kobe Plant, which is equivalent to the heat consumption of fossil fuel, and the Green Power Certificate at Chateau Mercian, which is equivalent to the entire electricity consumption.
We have also been sponsoring the Yokohama City Wind Power Generation Project which Yokohama City promotes using the Green Power Certification System, as a Y (Yokohama)-Green Partner since 2007, supporting the promotion of the use of natural energy. So far, the power generated by this project has been used by Kokoniwa, the communication space at Group Head Office, Spring Valley Brewery Tokyo and the Earth Hour hosted by WWF.

Yokohama City Wind Power Plant (Hama Wing)

Solar power generation

Manufacturing plants, including those of Kirin Brewery and Kirin Beverage, have installed solar-power generation equipment in their factory tour facilities and other locations. As part of the Kanagawa Prefectural Governments' Thin-Film Solar Cell Promotion and Expansion Project, Kirin Brewery Yokohama Plant installed a thin-film solar cell in 2016. The Kirin Brewery Yokohama Plant, Kyowa Hakko Bio, and Shinshu Beverage have leased parts of their premises and building roofs to companies that build large-scale solar power generation facilities, contributing both to effective use of company assets and to dissemination of natural energy.

Status of installation of solar power generation facilities→P.92

Yokohama plant

Kyowa Hakko Bio

Introduction of solar power generation by Lion

In line with Kirin and Lion's commitment to the Paris Climate Agreement, Lion has implemented energy optimisation and renewable energy investment as two key strategic initiatives to reduce carbon emissions and meet the 30% Science-Based Target. To support this strategy, and the United National Sustainable Development Goals 13 (Climate Action) and Goal 7 (Affordable and Clean Energy), Lion are proud to see their first large-scale solar power system being installed in 2019, at the iconic XXXX Brewery in Brisbane, Queensland. The Solar Photovoltaic (Solar PV) system will be 690 kW and will be connected to the state's electricity grid. The Brewery's transition to being partially-run by a renewable energy source is expected to reduce the facility's carbon emissions by 1,260 tonnes per year, which is approximately 7% of carbon emissions from electricity used.
690 kW is approximately one hundred times greater than a large residential system. The XXXX Brewery Solar PV system will consist of 2,168 solar panels: 302 panels will be installed on the roof of Keg Store building, 1,866 panels will be installed on the Packaging Building, 810 panels above the can line, and 1,056 panels will be installed above the glass line.
Construction commenced in March 2019 and is due to completion by mid-2019.

GHG data

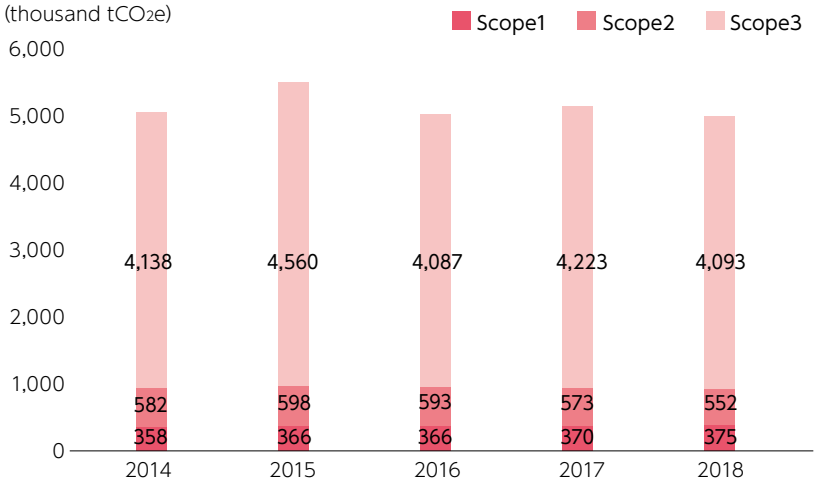
Third-party assurance report→P.99
Related Information→P.88～92

Value chain greenhouse gas emissions

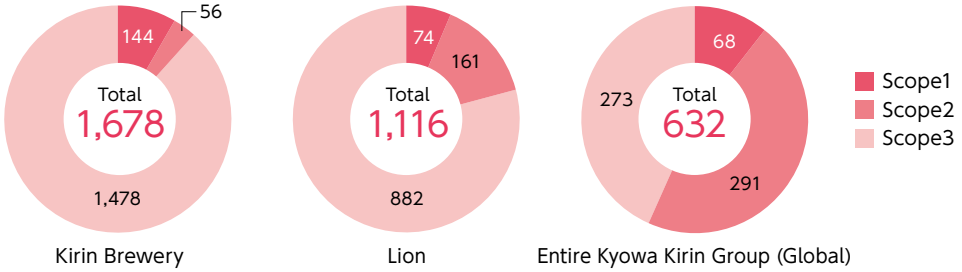
(Unit : tCO2e)

		2014	2015	2016	2017	2108
Direct emissions from corporate activities (Scope 1 + Scope 2)		940,230	964,392	959,070	943,194	927,337
	Scope 1 (Emissions from use of fuel)	358,018	366,286	365,680	370,340	375,096
	Scope 2 (Emissions related to purchase of power and steam)	582,213	598,106	593,391	572,855	552,241
Indirect emissions (Scope 3)		4,138,414	4,560,065	4,087,271	4,222,803	4,092,881
	Raw materials (Category 1)	2,682,624	2,811,940	2,626,854	2,557,411	2,446,307
	Transport - Upstream (Category 4)	331,521	384,873	374,510	363,123	365,183
	Transport - Downstream (Category 9)	851,203	979,569	787,665	941,234	923,083
	Product use/disposal (Category 11, 12)	76,935	178,557	80,111	158,309	152,648
	Other (Category 2, 3, 5, 6, 7, 8, 10, 13, 14, 15)	196,131	205,126	218,131	202,727	205,660
Emissions from entire value chain (Scope 1 + Scope 2 + Scope 3)		5,078,644	5,524,457	5,046,341	5,165,998	5,020,218

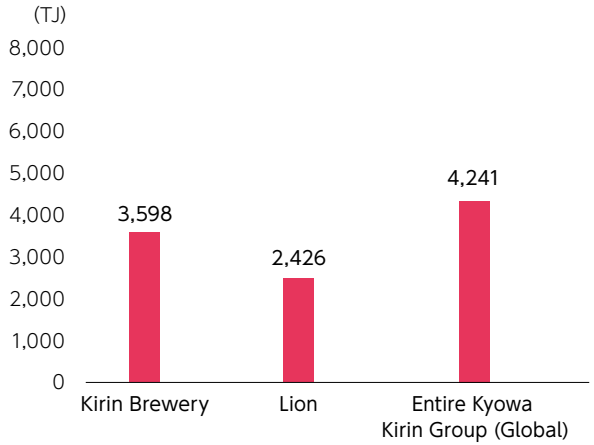
Trend in value chain greenhouse gas emissions



Greenhouse emissions by business (thousand tCO2e)



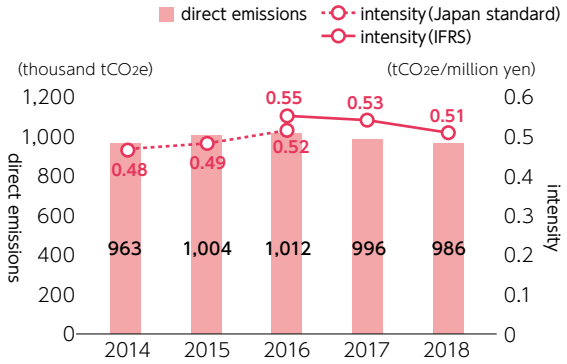
Energy use by business (2018)



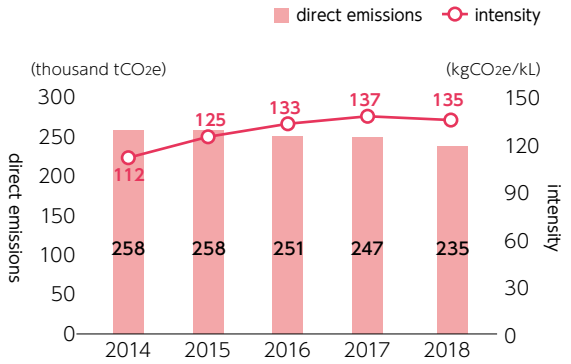
GHG Graphs

Related Information→P.88～92

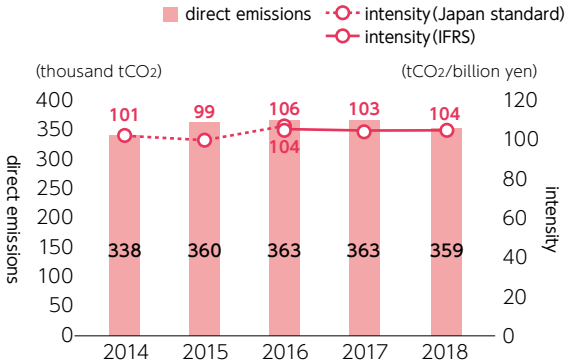
Total direct emissions (Scope 1+2) and intensity (emissions/sales revenue)



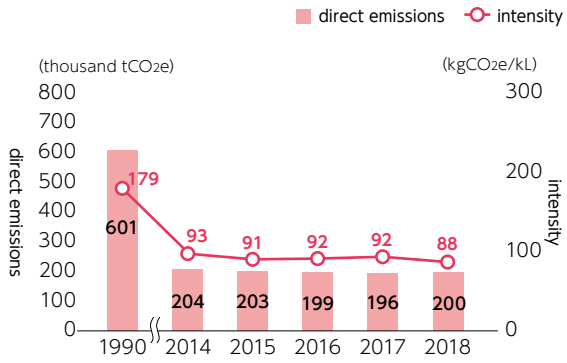
Direct emissions (Scope 1+2) and intensity (emissions/production) of Lion



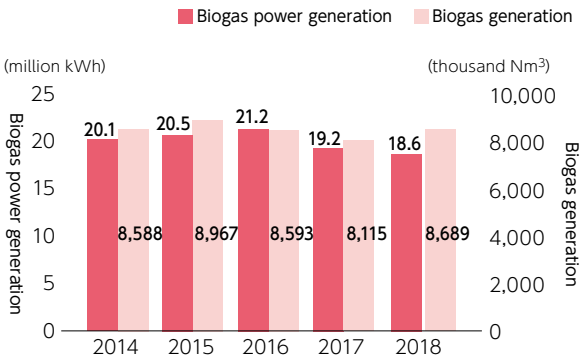
Direct emissions (Scope 1+2) and intensity (emissions/sales revenue) of entire Kyowa Kirin Group (global)



Direct emissions (Scope 1+2) and intensity (emissions/production) of Kirin Brewery



Biogas generation and power generation by Kirin Brewery's



Governance and Risk Management

Corporate Governance System

Basic View on Corporate Governance

In line with the corporate philosophy and "One KIRIN" Values that are shared across the Kirin Group, the Kirin Group believes that achieving the "2027 Vision" outlined in the Kirin Group's Long-Term Management Vision "Kirin Group Vision 2027 (KV2027)" will lead to the Kirin Group's sustainable growth and to greater corporate value over the medium to long term. Accordingly, the Kirin Group will develop a corporate governance system that is capable of effectively and efficiently reaching that goal.
The Kirin Group believes that cooperation with all of its stakeholders will be indispensable in order to put the corporate philosophy into practice and turn the "2027 Vision" that is based on this philosophy into a reality, and therefore the Group respects its stakeholders' respective viewpoints. The Kirin Group will disclose information promptly to its shareholders and investors in a transparent, fair and consistent fashion, will proactively engage in constructive dialogue with its shareholders and investors, and will fulfill its accountability with integrity.

Evaluations of the Board of Directors' effectiveness

Kirin Holdings routinely conducts evaluations of the management of the Board of Directors and the content of its discussions, and strives to ensure important decision-making and monitoring functions.

Details are shown on Page 64 of the KIRIN CSV REPORT 2019 or Corporate Governance Report

KIRIN CSV REPORT 2019
https://www.kirinholdings.co.jp/english/ir/library/integrated/

Corporate Governance Report
https://www.kirinholdings.co.jp/english/ir/governance/pdf/e_governance_report.pdf
Corporate Governance Policy
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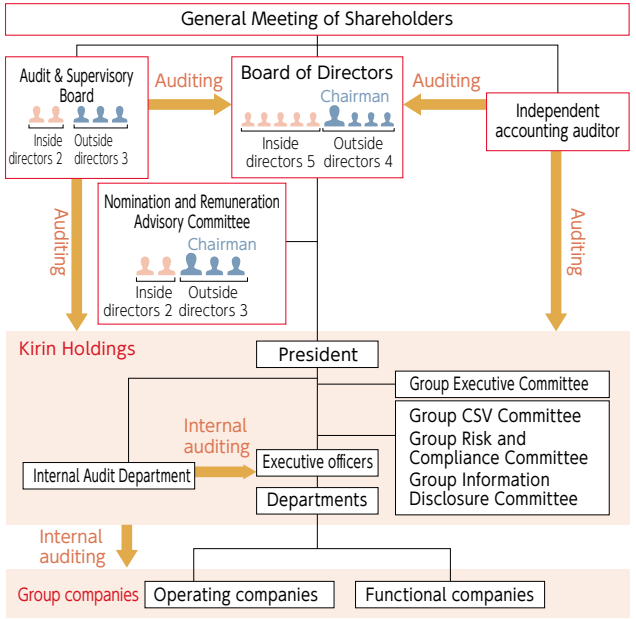
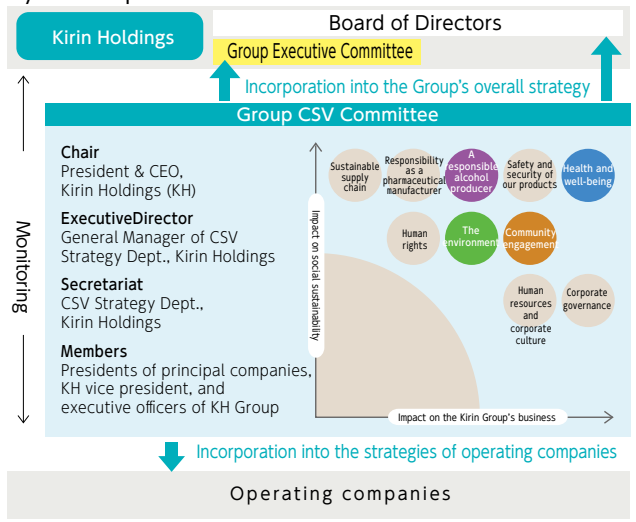


Group CSV Committee

The Kirin Group convenes its Group CSV Committee once a year as a general rule to encourage the proactive, self-driven pursuit of CSV management by the individual Group companies.
The Committee is chaired by the President of Kirin Holdings, with the presidents, vice-presidents, and executive officers of the major operating companies making up its membership. The committee decides on an order of priority for important CSV issues for the Group as a whole (Group Materiality Matrix).
In addition to monitoring the implementation status of the CSV Commitment, it also discusses policies and strategies as required. Where necessary, the matters decided in the Group CSV Committee are reported to and/or placed on the agenda of Kirin Holdings' Group Executive Committee and the Board of Directors and reflected in the strategies of the entire Group. The Committee Chairman also directs the various divisions of Kirin Holdings and the individual Group companies on ways to improve their pursuit of CSV as a means of raising the degree of implementation of the policies and strategies decided by the Committee.
At the CSV Committee meeting convened in May 2018, in line with the establishment of the new Medium-Term Business Plan, after a process that included stakeholder dialogue, the future demands of society were identified and the coverage and content of the issues it deals with were reviewed. At the Group CSV Committee meeting in June 2019, the members discussed how to put the CSV Purpose and updated CSV Commitment, which had been announced in February 2019, into action, shared the ESG evaluations of the Kirin Group, and discussed the enhancement of CSV management based on scenario analysis.

System to promote CSV



Risk Management

Approach to risk management

The Kirin Group defines risk as uncertainty with the potential to seriously impede the accomplishment of business targets or impact business continuity. A “crisis” refers to a situation in which a risk is actualized at a certain point and therefore needs to be addressed on an urgent basis.
The Kirin Group’s basic risk management policy is to seek to prevent risk from being actualized, to effectively maintain compliance, and to continue earning the trust of customers, employees, shareholders, and society over the long term.

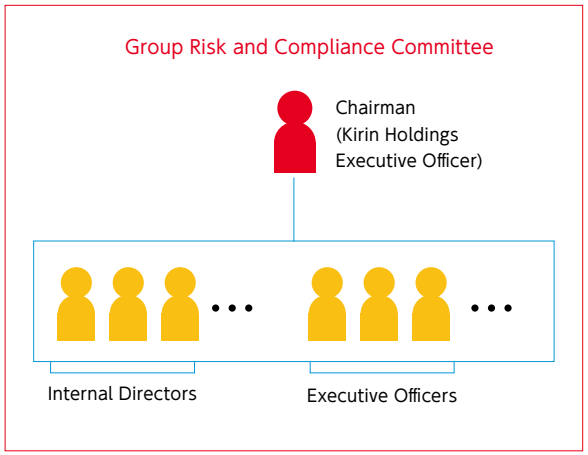
Risk management structure

The Kirin Holdings Group Risk and Compliance Committee oversees the risk management activities of the Kirin Group. Kirin Holdings internal directors and executive officers serve on the committee, and an executive officer serves as the committee chair.
Each Kirin Group company also has a committee dedicated to risk management. The risk management committees of Kirin Holdings and the Kirin Group companies meet quarterly to conduct risk monitoring.

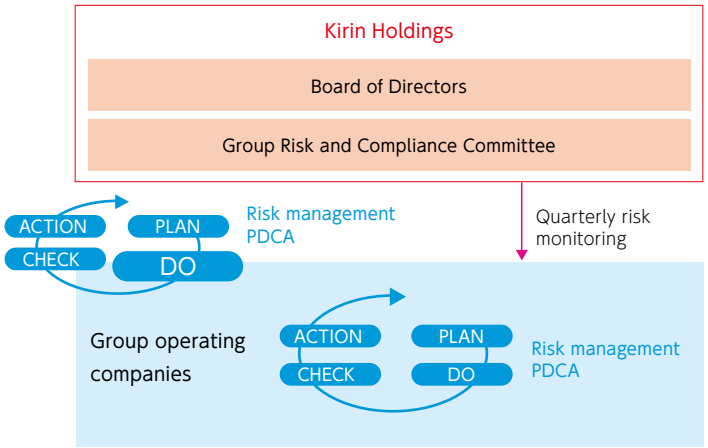
Process for designation of serious risk

Kirin Group companies, in conformance with the group risk management policy, identify and examine the quantitative and qualitative risk associated with their business activities. The Group Risk and Compliance Committee Administrative Office (Kirin Holdings Corporate Strategy Department) surveys and investigates all risks. The committee defines serious risks to the Group as risks considered to have a potentially strong impact, a high likelihood of occurring, or widespread ramifications.

Risk management structure

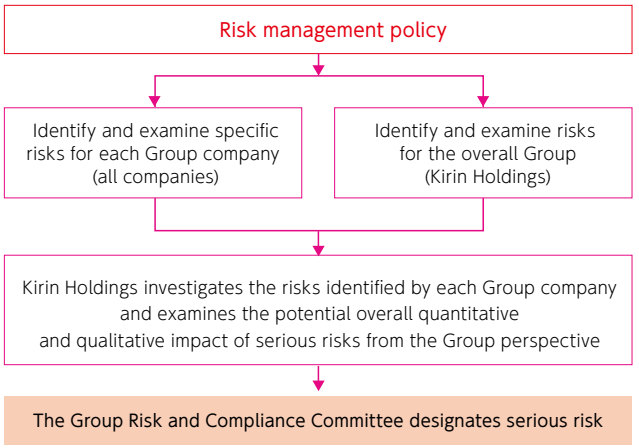


Risk management PDCA cycle



※Domestic and overseas consolidated subsidiaries

Designation of serious risk



Business risk impact and countermeasures

The Kirin Group quantitatively and qualitatively evaluates the potential impact and probability of occurrence of each risk. Risks determined to have a strong potential impact are designated as serious risks. The Group communicates the serious risks to the executive managements of Kirin Holdings and each group company, establishes clear roles for each company and department, and prescribes risk reduction measures.
The Group regularly monitors the risk conditions and the progress with countermeasures and when necessary reviews the status of the serious risks.

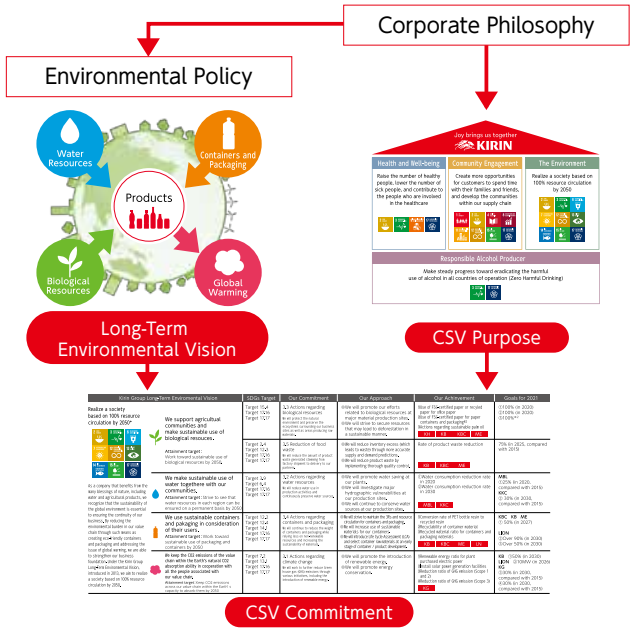
Details are shown on Page 51～52 of the KIRIN CSV REPORT 2019.
https://www.kirinholdings.co.jp/english/ir/library/integrated/

Serious risks in each business domain

	Serious risk	Potential impact on business	Countermeasures
①Food & Beverages domain (Alcoholic & non-alcoholic beverages businesses)	Changes in consumer preferences, such as from price polarization and diversification of preference, alter the market environment and competition and impact sales of core products	The Group's competitive advantage weakens due to sales of core products falling short of targets	Strengthen customer-centric marketing capability to maintain and cultivate strong brand power
	The impact of climate change, torrential rain, drought, unusually cold summers, weather abnormalities or large-scale natural disasters such as an earthquake	Supply chain disruptions halt or delay product deliveries	Expand and strengthen delivery capabilities; prepare and implement a business continuity plan; establish crisis task forces
②Pharmaceuticals domain (Pharmaceuticals & Bio-chemicals businesses)	Inability to adequately accelerate business overseas along with developing and launching global strategic products	Delayed business development	Develop business in Europe, the United States, and Asia; establish a firm foundation for sustained business growth
	Technical or legal problems at manufacturing and logistics facilities	Product supply disruption, delay, or shortages	Formulate a global supply chain management structure
③Businesses bridging Pharmaceuticals and Food & Beverages	Slow progress formulating a competitive business model and suitable organizational and governance structures	Stalled establishment or fostering of new businesses	• Use Kirin Group expertise and experience to develop businesses • Incorporate insight received from customers into our operations and improve our organizational ability to integrate customer insight

System for the Promotion of Environmental Management

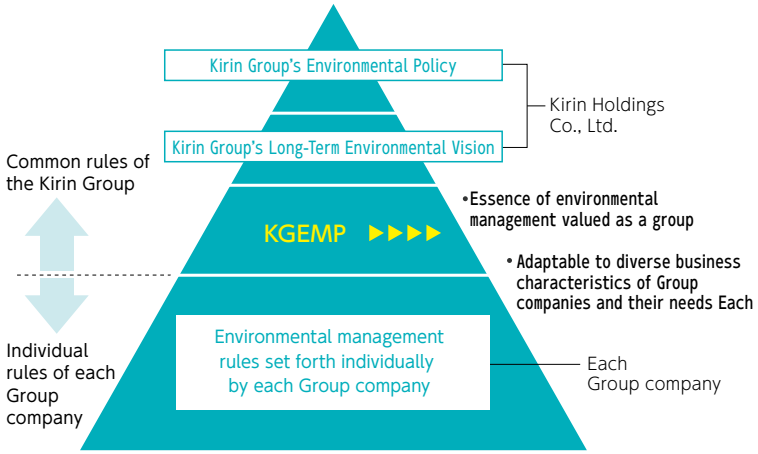
The Kirin Group's environmental management is conducted as part of the CSV management system.
All companies in the Group share the Kirin Group's Environmental Policy, which was established in 2008, and the Kirin Group Long-Term Environmental Vision, which was approved by the Kirin Holding's Board of Directors in 2012 and announced publicly in 2013.
To realize the goals of the Kirin Group's Environmental Policy, Kirin Group's Long-Term Environmental Vision, and CSV Commitment, Group companies gather the opinions of stakeholders in an appropriate manner, identify and assess the risks and opportunities related to the environmental activities of their businesses, and take necessary action from medium to long-term perspectives.
Under the Principle for Kirin Group's Global Environmental Management (KGEMP), which were established as a requirement of the Group's environmental management system, each Group company builds and manages its own environmental management system that best suits the nature of its own business, region, and other characteristics and is based on the international standard, ISO 14001.



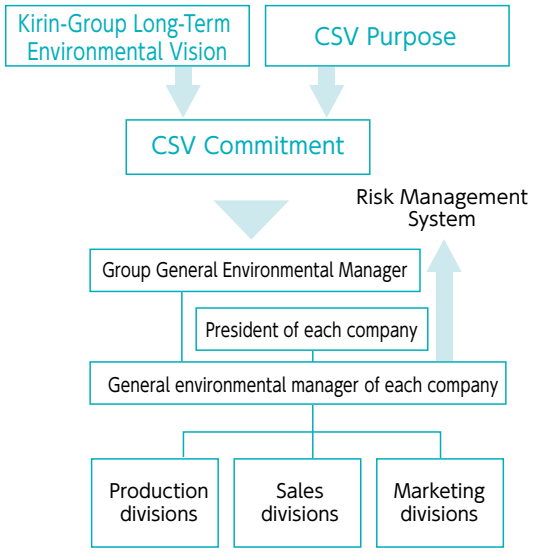
Environmental management Structure

Under the KGEMP, a Group general environmental manager has been appointed as the chief executive officer for all Group environmental matters. As of April 2019, this role is held by the Senior Executive Officer of Kirin Holdings Company, Limited with responsibility for CSV strategy.
The KGEMP also requires the appointment of a general environmental manager, who has responsibility and authority for environmental matters in each business. In addition to monitoring to ensure that the company and its constituent companies are conducting their environmental activities appropriately, the general environmental manager conducts management reviews, identifies issues for improvement, and gives necessary directions to the relevant departments.
In the event of an environmental crisis, the general environmental manager will have full authority to resolve the crisis. The KGEMP stipulates that each company complies with laws and regulations and other rules relevant to the business's environmental activities, and strives to reduce its environmental load as well as prevent pollution under its own environmental management system. Each company will also conduct internal environmental audits to ascertain the appropriateness and legal compliance of their systems and confirm how well targets are being met. The results of these audits will then lead into management reviews.
The management of environment-related processes is integrated with company management processes in a manner suited to the companies' respective regions.
CSV goals, including those for the environment, are incorporated into the goal-setting for each organization and individual, and the degree to which those goals are reached is reflected in the evaluated performances of the organizations and individuals.

Principle for Kirin Group's Global Environmental Management (KGEMP)



Environmental Management Structure



Environmental audits

Each of the operating companies in the Kirin Group complies with ISO 14001 and other environmental management system standards. Internal auditing is conducted in each business location and constituent company, and the environmental management divisions in the head offices of each Group company conduct auditing of business locations and constituent companies. These audits lead to improvements in the individual companies' environmental management systems. Furthermore, on an entire Group basis, Kirin Holdings Company Ltd.'s CSV Strategy Department is contracted by Kirin Holdings to conduct environmental audits according to criteria established by the Group. These audits lead to improvements in each company's environmental management system and are fed into to management reviews.
In Japan, to guarantee further transparency and independence, an outside consultant has been contracted to perform a strict environmental legal audit, beginning in 2009. By 2014, the consultant had traveled around to all manufacturing sites in the Group companies. It has since embarked on a second round of audits, beginning in 2015, with several sites being audited each year.
Two sites were audited in 2018, with only minor issues identified at both sites.

Status of compliance with environmental laws and regulations

Each business location is thorough in its management of legal requirements through a ledger, and also works exhaustively to prevent environmental pollution by establishing voluntary management targets that are more stringent than those required by the legislation. A system for the reporting of environmental accidents has also been established within the Group, in which hiyari-hatto (near-miss) examples are shared within the group and counter-measures extended to other sites. Internal environmental audits are used to confirm the status of legal compliance.

Appropriate management of waste

The Kirin Group is working toward its declared goal of the implementation and firm establishment of thorough appropriate management of waste. To this end, it has developed the Kirin Group Waste Management Guidelines and is pursuing the appropriate treatment of waste within common Group systems.
Specific measures include the standardization of contract templates and contractor audit programs which define its frequency and contents, and the preparation of a list of staff in charge of waste management so that all the staff involved in such work can be educated using standardized textbooks. Further, the information on all waste disposal contractors for the Group is managed collectively, so if in the unlikely event that a problem arises, the details about the contractor, its permits, the waste it is being contracted to handle, and other details can be searched and confirmed immediately. The operations are being standardized in this way so that anyone who is newly assigned to waste-related work will be able to perform it with certainty.

Recycling rate 100%

The Japanese alcoholic and non-alcoholic beverages businesses (Kirin Brewery, Kirin Beverage, Kirin Distillery) have set a recycling rate target of 100% for their plants and have continued to achieve that target.
Four plants, including the Kirin Brewery Yokohama Plant, first achieved a recycling rate of 100% in 1994, and in 1998, all plants achieved 100%, the first time in the beer industry.

Preventing Air Pollution

The Kirin Group strives to comply with all laws and regulations relating to air pollution in the various countries in which we operate. We have established voluntary standards that exceed those required by environmental legislation and are working to reduce our emission of atmospheric pollutants.
For example, for transport in Japan, we are pursuing the introduction of vehicles that comply with the NOx & PM Act in metropolitan areas. We are also increasing the load capacity per vehicle by switching to larger trucks and reduce the total number of trucks.

Preventing Water Pollution

The Kirin Group thoroughly complies with laws and regulations for preventing water pollution in each of the countries where we operate and minimizes wastewater loads by setting our own strict control values, which go beyond those required by law.

Preventing Soil Contamination

When selling assets, the Kirin Group conducts thorough investigations of soil contamination, addressing them where necessary.

Chemical substances

The Kirin Group manages its chemical substances appropriately based on the Act on Confirmation, etc. of Amounts of Release of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Act) and other relevant legislation. The Kyowa Kirin Group has set targets for volatile organic compounds (VOC), which, due to the nature of its business, make up the majority of the chemical substances it releases, and is taking action to reduce them.

Polychlorinated biphenyl (PCB)

Managing appropriately and disposing progressively according to the law.

Asbestos

Managing and isolating appropriately and treating progressively according to the law.

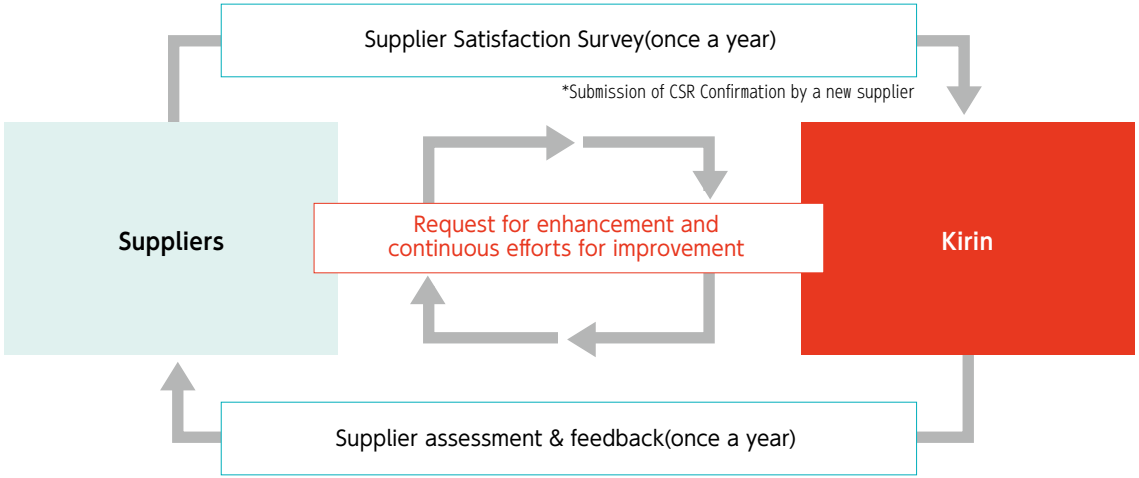
Related Information→P.93

Sustainable Procurement

To fulfill its social responsibility, the Kirin Group established the Kirin Group Sustainable Procurement Policy in September 2017. Listening to the opinions of our suppliers and other stakeholders, we will strive to facilitate their understanding of this policy and work with them to realize it.

Two-way communication with suppliers

The Kirin Group promotes sustainable procurement and, to fulfill its social responsibility in all processes in the value chain, it places importance on two-way communication with its suppliers.
The Japan Alcoholic and Non-Alcoholic Beverages Business asks new suppliers to submit a Supplier CSR Confirmation based on the six categories of the code of conduct stipulated in the Kirin Group Supplier CSR Guidelines, which were revised under the UN Guiding Principles on Business and Human Rights, and requires them to comply with the Code of Conduct.
In 2018, we held supplier briefings on four separate occasions over a period of two weeks, at which we explained the Kirin Group CSR Guidelines to approximately 250 suppliers.
After we commence trading with them, once a year, the status of our major suppliers' approaches to our sustainable procurement is checked and assessed by Kirin procurement staff.
The outcomes of those assessments are fed back to the supplier, along with the outcomes of evaluations of other categories such as quality standards, price superiority, and delivery response. If necessary, further investigations will be conducted and requests for corrections will be made.
Meanwhile, to ensure fair business practices, we periodically conduct a supplier satisfaction survey to seek feedback from suppliers to the Kirin Group and obtain their opinions about the Kirin Group's procurement activities.
Kyowa Kirin has established the Kyowa Kirin Group Procurement Basic Policy and has prepared the Kyowa Kirin CSR Purchasing Guide Book. It has also established a CSR Code of Conduct with which it asks suppliers to cooperate. It has also been conducting questionnaire surveys on the state of CSR initiatives since 2012, to ascertain the current situation at its suppliers.
Lion is working closely with its suppliers to establish a robust system to ensure goods and services are procured ethically and responsibly. The Lion Supplier Responsible Sourcing Code will be implemented this year, setting guidelines for acceptable sourcing criteria. The Code will also incorporate requirements of Australia's new Modern Slavery Bill, which came into effect 1 January 2019. Verification will be carried out using the SEDEX reporting platform, and supplier auditing where required. The Lion Supplier Responsible Sourcing Code is based on the standards of the Ethical Trading Initiative.
This series of activities constitutes a PDCA cycle through which we work continuously with suppliers in promoting sustainable procurement.



Environmental Education

Environmental Training

To mitigate environmental risk, the Kirin Group conducts an ongoing program for environmental training for its employees. This systematized training consists of training for environmental staff and training by job grade, including new employees. The training conducted at the Technical Talent Development Center has also been opened to Kirin Group companies in Japan.
In 2018, 21 people underwent the wastewater treatment course, and basic classes on topics such as wastewater treatment and waste management were delivered as part of new employee training.
Further, the Kirin Holdings CSV Strategy Department conducts systematized industrial waste training, which was held five times and 299 people underwent in 2018.

Scenery of environmental training

Raising Environmental Awareness within the Company

In-house communications, specifically employee newsletters and the intranet, are used to expand the depth and breadth of interest in and understanding of the environment among Kirin Group employees. At Group headquarters, videos presenting Kirin's environmental initiatives are screened on digital signage to deepen understanding among employees.

Employee newsletters
KIRIN CSV TIMES

Experiential Program

The Kirin Group conducts a CSV Experiential Program for Confronting Social Issues, a CSV training program that gives employees the opportunity to focus on social issues.
In 2018, programs were held to promote understanding of examples of the Creating Shared Value that Kirin engages in with society. These programs gave participants the change to experience first-hand actual operations and interactions with the local community in Tono in Iwate Prefecture, with which Kirin has had a connection in hops cultivation for more than fifty years, and in Ueda in Nagano Prefecture, where Mercian operates its own vineyard, Mariko Vineyard.

Fiscal Year	Program	Date	Number of participants
2017	At Tono hops farm	5/26 Fri～ 27 Sat	36
	At Ueda vineyard	9/22 Fri～ 23 Sat	31
2018	At Tono hops farm	6/1 Fri～ 2 Sat	36
	At Ueda vineyard	9/21 Fri～ 22 Sat	35

Stakeholder Engagement

To grow sustainably together with society, the Kirin Group has positioned Creating Shared Value (CSV) as the core of its company management in its Long-Term Management Vision, Kirin Group Vision 2027.
CSV management means achieving both solutions to social issues and the provision of value to customers. It realizes the creation of economic value and social value, with the aim of sustainable growth together with society. To achieve this, it is important that we establish and implement mechanisms for identifying and understanding the challenges, expectations, and demands of our diverse stakeholders and for two-way communication about whether or not Kirin's business characteristics and strengths can be leveraged to meet those challenges, expectations, and demands.
To this end, the Kirin Group has a range of opportunities for dialogue with the stakeholders involved in its business. In addition to dialogue, we also work together with many of our stakeholders and cooperate in voluntary activities that lead to policy recommendations.

Raw material production regions

In our support for Sri Lankan tea farms to obtain Rainforest Alliance certification, which began in 2013, Kirin staff travel to Sri Lanka once a year to exchange views with the plantation managers and local residents, to identify and address local issues.
During our 2016 visit, upon learning that small farms in the area wanted to obtain certification, we considered the matter and determined that increasing the sustainability of the small farm's tea leaves, which are transported to the larger farms, would also benefit Kirin.
The decision to conduct activities for the protection of water sources on the farms was also made upon direct confirmation of the situation.
Further, in response to requests from tea farmers who aim for more sustainable tea leaves, we have taken a step further from support for obtaining certification and have started assisting farmers with initiatives to move away from the use of chemical pesticides and with trials that will enable them to grow tea more efficiently.
The dialogue with the farms during our annual visits to the area are an invaluable opportunity for the company and the local producers to share their respective needs and issues, with a view to achieving more sustainable, higher quality and efficient tea leaves production.
In Myanmar, after the establishment of the Kirin Group Human Rights Policy in February 2018, we conducted human rights impact assessments in May and August of the same year. We identified areas with relatively more negative risks on human rights and set targets for action up to 2021. In particular, we are working on ensuring transparency in the supply chain for rice, one of our ingredients, and strengthening management.

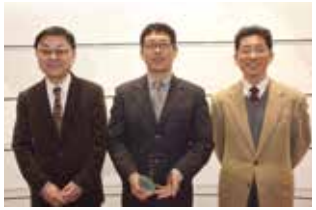
Details are shown on Page 52 of the KIRIN CSV REPORT 2019.
https://www.kirinholdings.co.jp/english/ir/library/integrated/






Experts

In ecological surveys on the process of converting idle and devastated land into vineyards, we ask the experts at the National Agriculture and Food Research Organization (NARO), our partner in joint research, to held a joint research presentation once a year. In addition to sharing the knowledge obtained through this research, we discuss how to proceed into the future.
Some of the outcomes from the joint research were presented to the 66th National Conference of the Ecological Society of Japan on March 16, 2019. We intend to keep publishing the knowledge of this research widely in the future.
Also, at the request of the Ministry of the Environment, we sent a member to the 2018 Working Group on the Revision of Environmental Reporting Guidelines and the 2019 Working Group on guidance and technical notes supplementing Environmental Reporting Guidelines 2018, where he deliberated with experts about disclosure of environmental information. This debate on the proper disclosure of environmental information has become a valuable source of knowledge for the Kirin Group's own information disclosure. The Environmental Reporting Guidelines (2018 Edition) and the supplementary Guidance and Technical Notes have been published on the Ministry of the Environment website.



Dialog with the National Agriculture and Food Research Organization

Youth

To foster two-way communication with junior and senior high school students, the Kirin Group holds workshops for students in this age group called the Kirin School Challenge. People of international NGOs that the Kirin Group supports also participate in these workshops, which include lectures as well as forums for the exchange of opinions with the participating students. The outcomes of these workshops are fed back into our environmental initiatives.
We also continue to support the Japan Environmental Youth Network, which supports events where senior high school students present reports on their environmental activities. As part of our initiatives, we invite senior high school students to visit our laboratories and ingredient production regions, and hold discussions with students at symposiums hosted by the Japan Environmental Youth Network Secretariat, and other forums.
In FY2018, we were honored to serve on the adjudication panel at the Kanto Convention and National Convention of the Japan Environmental Youth Network.

Kirin School Challenge Award Ceremony


National Convention of the Japan Environmental Youth Network

Investors

In June 2018, we held a CSV briefing for analysts and investors at the Kirin Brewery Yokohama Plant on the topics of "approach to the environment" and "the strengths of Kirin's technological expertise." At the briefing, we explained the various initiatives on the four themes of the Long-Term Environmental Vision, and the weight reduction technologies for containers and packaging being developed by the Research Laboratories for Packaging Technologies. We also gave attendees a tour of the Laboratories and the Yokohama Plant. This briefing provided an opportunity to give the analysts and investors who attended a deeper understanding of the fact that the Kirin Group's efforts are contributing to reducing environmental load and improving sustainability, as well as leading to cost reductions, and that, through these efforts, we are striving to achieve a balance of social and economic value.

Details is shown on the IR/Investor Information Archives.
https://www.kirinholdings.co.jp/english/ir/library/event/archive.html

Environmental Data

Kirin Group's Environmental Policy

Basic policy

Kirin Group, a supplier of food and health products, will contribute to building a society where people and nature live in harmony by reducing the carbon footprint of all its business operations, implementing environmental conservation activities, and bringing environmental value to its customers.

Activity policy

1. Implementing an environmental policy throughout the entire value chain and all aspects of business activities, and
2. Assuring the quality of environmental activities through assessments and audits.

Under the leadership of top management and through the participation of all employees, Kirin Group will incorporate environmental measures into business management and pursue challenging goals by recognizing them as one of the top management priorities.

- **Legal requirements**
  We will comply with environmental laws, regulations, and agreements as well as voluntary control standards with high moral values.
- **Technological development**
  We will develop technologies that coexist with nature and are valuable for both the global environment and our customers.
- **Environmental management**
  We will develop an environmental management system and make continuous improvements in accordance with our business strategy.
- **Human resources development**
  We will make continuous efforts to develop human resources who contribute to environmental conservation activities.
- **Environmental performance**
  We will promote resource/energy saving, reduce greenhouse gas emissions, prevent environmental pollution, and promote the 3 R's (Reduce, Reuse, Recycle).
- **Communication**
  We will conduct community-based environmental conservation activities while providing accurate environmental information to increase transparency and gain trust.

Policies on biological resources

From an early stage, the Kirin Group has been pursuing initiatives concerning biological resources, which have a high possibility of being connected to environmental and human rights issues.
After making a Declaration of Support for Biodiversity Conservation in 2010, in 2013, we formulated the Kirin Group's Guidelines on Sustainable Sourcing of Biological Resources and the Action Plan on Sustainable Use of Biological Resources. Black tea leaves, paper and printed materials, and palm oil are specified in the Guidelines and Action Plan as particularly important supplies. After the formulation and announcement of the Kirin Group CSV Commitment in February 2017, we revised the Kirin Group Action Plan on Sustainable Use of Biological Resources and accelerated our initiatives.

Kirin Group's Declaration of Support for Biodiversity Conservation

Kirin Group relies on the bounty of nature to make products. We utilize the power and wisdom nature has to offer in conducting its business activities. Because of that, we recognize the importance of conserving biodiversity as business challenges. Kirin Group actively pursues a broad range of activities to protect biodiversity in order to continue offering new joys of "food and well-being" into the future.

1. **Kirin Group promotes sustainable use of resources while ensuring conservation of biodiversity**
   The Kirin Group is committed to sustainable use of resources while taking biodiversity into consideration in all of its business activities so that all people around the world may continue to enjoy the bounty of nature.
2. **Kirin Group makes effective use of its technologies**
   As a company that offers new joys of "food and well-being," the Kirin Group makes effective use of its technologies when conducting business activities to contribute to the sustainable use of resources and protection of biodiversity.
3. **Kirin Group works in cooperation with stakeholders**
   Kirin Group adds a biodiversity perspective to the environmental protection activities which have continuously been engaged in and works in cooperation with customers and local partners to continue conserving biodiversity.
4. **Kirin Group properly complies with treaties and laws**
   Kirin Group complies with treaties, laws and regulations concerning biodiversity and strives to help people enjoy the blessings of biodiversity worldwide.

Kirin Group's Guidelines on Sustainable Sourcing of Biological Resources

Purpose The purpose of the Guidelines is to present the fundamental principles of the Group so that it can continue to ensure the "sustainable sourcing of biological resources" based on the Kirin Group's Declaration of Support for Biodiversity Conservation.

Applicable scope The Guidelines apply to biological resources procured by the Kirin Group's operating companies in Japan for which the Group has specified that there is risk of illegal deforestation, environmental destruction and such like based on risk assessment performed.

Guidelines on Sustainable Sourcing of Biological Resources

Kirin Group procures applicable biological resources based on the following principles.

1. **Resources that the Group has confirmed;**
   not to derive from a plantation developed illegally, to have been produced through appropriate procedures in compliance with the laws and regulations of the areas where the raw material is produced.
2. **Resources deriving from plantations, forests, etc. that have been certified by credible third parties.**
3. **Resources that have not been produced by entities which are considered to be involved in environmental destructions.*1**

*1 Reference is currently made to the FSC' s Policy for the Association of Organization with FSC.

Kirin Group's Guidelines on Access to Genetic Resources

In order to enjoy the blessings of biodiversity worldwide, it is important to ensure proper management of genetic resources in accordance with the relevant laws and regulations agreed upon by the international community. Given the Nagoya Protocol adopted at COP 10, the Kirin Group established its Group Guidelines on the access to genetic resources and has been operating accordingly.

Kirin Group's Principles of Managing Access to Genetic Resources

1. **The Group shall respect international agreements concerning biodiversity.**
2. **Access to genetic resources shall be based on prior informed consent of the country providing such resources, and no genetic resources whose backgrounds are unknown shall be carried in or used.**
3. **Use of genetic resources, including fair and equitable sharing of the benefits arising out of their utilization, shall be properly managed in accordance with international treaties.**

Kirin Group Action Plan for the Sustainable Use of Biological Resources

1. Black Tea

Kirin Company, Limited conducts the following three-step survey and, through annual reviews, is raising the level of sustainability.

Step.1 Specify the tea growers from which to procure black tea leaves.
Step.2 Evaluate the sustainability*1 of the specified growers.
Step.3 Aim to use black tea leaves from those growers with a high level of sustainability.

2. Paper and Printed Materials

Kirin Company, Limited, Kirin Brewery Company, Limited, Kirin Beverage Company, Limited and Mercian Corporation will:

Office paper*2
aim to use only FSC®-certified paper or recycled paper by the end of 2020.

Containers and packaging*3 *4
1) 6-can packs: aim to use only FSC-certified paper by the end of 2017.
2) Gift boxes: aim to use only FSC-certified paper by the end of 2020.
3) Drink boxes: aim to use only FSC-certified paper by the end of 2020.
4) Cardboard cartons for products: aim to use only FSC-certified paper by the end of 2020.

Other
Priority will be given to the use of paper that is FSC-certified, paper made with wood from FSC-managed forests, paper made from recycled paper, and paper that has been confirmed through supplier surveys as not resulting in the destruction of high conservation value forests*5.

3. Palm Oil*6

Operating companies in Japan will use the Book and Claim model in their handling of palm oil used as a primary or secondary ingredient. Book and Claim is a model for the trading of certificates approved by the Roundtable on Sustainable Palm Oil (RSPO).
When the identification of palm oil producers and the direct purchase of sufficient quantities of RSPO-certified palm oil becomes possible, a new, upgraded action plan will be formulated.

Notes
*1 Sustainability of tea in Step 2 will be evaluated according to the status of Rainforest Alliance certification.
*2 "Office paper" refers to copy paper, envelopes (excluding non-standard sizes and some industrial-use envelopes), business cards, and printed materials such as company pamphlets.
*3 Includes Kirin-Tropicana Inc.
*4 Excludes limited-edition products, small-lot product varieties, special shapes, imported products, etc.
*5 HCVF (High Conservation Value Forest), as defined by FSC®.
*6 Palm oil refers to the oil derived from the fruit of the oil palms, and includes palm kernel oil obtained from their seeds.

Established on February 2013
Revised on February 2017

Consideration of the Environment in Product Development

Environmentally Conscious Designs for Containers and Packaging

To further step up conservation of resources and promote activities to reduce environmental impact, the Kirin Group operates on its "Guidelines on Environmentally Conscious Design for Containers and Packaging," which has detailed provisions for what materials may be used and in what combinations. Originally established by Kirin Brewery in 1998, the Guidelines have been widely applied to its entire alcoholic and non-alcoholic beverages business since 2014. In 2019, it was expanded to all Kirin Group companies in Japan, excluding the Pharmaceutical Business.

LCA Initiatives for Containers

The Kirin Group performs LCA (Life Cycle Assessment)* on major containers for alcoholic beverages and non-alcoholic beverages whenever necessary. For example, in the case of a glass bottle, we make an assessment by performing calculations in consideration of raw materials used for all parts of the bottle, including the glass, paper for labels, and crown cap, energy used to produce raw materials, and energy associated with recycling after use. We also take into account the product characteristics, unit of purchase by customer at each purchase, major sales store format, projection on collection of empty containers and other relevant factors on a comprehensive basis to select containers.

Guidelines on Environmentally Conscious Design for Containers and Packaging

1. Purpose

The Kirin Group aims to pass down the bounty of natural environment of our Earth in sustainable form to the future generations and continue providing value to customers and society on the whole. To this end, we comply with the relevant laws and regulations and with the Guidelines on Environmentally Conscious Design for Containers and Packaging in pursuing product development in consideration of the environment and promoting reduction and recycling of wastes in its business activities. By so doing, the Kirin Group aims to realize a society that is based on 100% recycling so as to balance the environmental impact produced by the Kirin Group's value chain with the Earth's ability to supply resources.

2. Basic Concept for Development, Design and Adoption of Containers and Packaging

(1) In development and design, maintain quality, safety and hygiene of product contents, safety of containers and packaging, and appropriate presentation of product information as prerequisites, and take into account environmental applicability, user-friendliness, transport efficiency and economic performance.
(2) In adoption, select containers and packaging that meet customers' purchasing and drinking styles, form of selling, and characteristics of product contents.

3. Concept of Caring for the Environment in Development, Design and Adoption of Containers and Packaging

(1) Strive to reduce the environmental impact associated with containers and packaging throughout the lifecycle, i.e., from procurement to recycling, and keep the impact on the natural environment to a minimum.
(2) In order to make effective use of resources and contribute to the realization of society that is based on recycling, use materials that are easy to recycle or dispose of and that have minimal environmental impact.
(3) In order to contribute to realizing a low-carbon society, select materials that require low energy use and that generate minimal greenhouse gas emissions during processes of manufacturing containers and packaging and of transporting products.
(4) Select materials in consideration of preventing environmental pollution at the stage of disposal.
(5) Promote the 3R (reduce, reuse, recycle) activities in accordance with the following.

4. Guidelines for Promoting the 3Rs (Reduce, Reuse, Recycle)

(1) Reduce
1. Make efforts to reduce weight of containers and packaging, sales promotion tools, etc. and to reduce the amount of materials used.
2. Make efforts to design containers and packaging so that the volume can be reduced as much as possible by folding or crushing them when they are recycled or disposed of.
3. Shift to simple packaging, try to eliminate individual pieces of wrapping and outer packaging, and make efforts to keep packaging reasonable.

(2) Reuse
1. Make efforts to design containers and packaging so that the number of reuses and refills can be repeated as much as possible.
2. Make efforts to keep the environmental impact associated with reuse and refilling as small as possible.

(3) Recycle
1. Use single material as much as possible, and when using two or more types of materials, make efforts so as to enable their easy separation.
2. Make efforts to use recycled materials and those with high recycling rates.
3. Make efforts to adopt specifications and designs that facilitate separated discharge, sorted collection, and material sorting.

Revised on November 18, 2014

Stakeholder Dialogue

Voluntary participation leading to policy recommendations

Organization	Activities
Japan Sustainability Local Group (JSLG)	Kirin Holdings participates as a steering committee member and director of the JSLG.
WE MEAN BUSINESS	In the WE MEAN BUSINESS coalition, the Kirin Group has committed to "setting reduction targets by SBT," "report on climate change responses in mainstream reports by CDSB" and "improvement of water security."
Science Based Targets (SBT)	The Kirin Group's emission reduction targets for 2030 were the first in Japan's food and beverages industry to be approved by SBT.
Fun to Share/COOL CHOICE	Since 2014, Kirin has endorsed the Japanese government's new climate change campaigns, Fun to Share and COOL CHOICE, and has registered with these campaigns.
United Nations Global Compact	The Kirin Group joined the United Nations Global Compact in September 2005.
Voluntary Action Plan of Japan Business Federation (Nippon Keidanren)	In consideration of the conservation of the global environment, the Brewers Association of Japan, of which Kirin Brewery is a member, and the Japan Soft Drink Association, of which Kirin Beverage is a member, participate in initiatives for the reduction of environmental load conducted by Nippon Keidanren (Japan Business Federation) and are tackling CO_2 reductions and the recycling of waste.
Eco-First	Eco-First is a program in which companies make a pledge to the Minister of the Environment to conduct their own environmental conservation initiatives, such as counter-measures to global warming. The Kirin Group was the first manufacturer to be Eco-First accredited. It also participates in the Eco-First Promotion Council whose members comprise accredited companies.
Japan Business and Biodiversity Project	Kirin Holdings has joined the Japan Business and Biodiversity Partnership, which was established by Nippon Keidanren (Japan Business Federation), Japan Chamber of Commerce and Industry, and Keizai Doyukai (Japan Association of Corporate Executives) in 2010.

Organization	Activities
Green Purchasing Network (GPN)	The Kirin Group is a member of the Green Purchasing Network (GPN).
Containers and Packaging Diet Declaration by nine prefectures and cities	Kirin Brewery, Kirin Beverage, and Mercian endorse the Containers and Packaging Diet Declaration being promoted by the four prefectures of Saitama, Chiba, Tokyo, and Kanagawa, and the five cities of Yokohama, Kawasaki, Chiba, Saitama, and Sagamihara, and are striving to reduce their containers and packaging.
Forest Supporters	Forest Supporters Kirin participates in the activities of Forest Supporters, a civic movement that promotes the creation of beautiful forests. The National Land Afforestation Promotion Organization serves as secretariat for this movement.
Water Project	Kirin has been involved in the Water Project, a public-private sector collaborative awareness-raising project established to promote the maintenance and restoration of healthy water cycles, since 2014.
Rainforest Alliance Consortium	Kirin is a founding member of and active participant in the Rainforest Alliance Consortium, which was established in September 2015 by the Rainforest Alliance and companies that handle Rainforest Alliance certification products with the aim of promoting sustainable agriculture.
Consortium for Sustainable Paper Use (CSPU)	The Consortium for Sustainable Paper Use was established by five (now ten) companies engaged in leading-edge paper use initiatives and WWF Japan. As a founding member of the CSPU, the Kirin Group pursues initiatives for the pursuit of sustainable paper use.

Disclosure of environmental information through products (Environmental label, etc.)

Label Name	Nature of Disclosure
Eco-Rail	In 2006, Kirin Beverage, and in 2010, Kirin Brewery were certified to display the "Eco-Rail" mark on their products by the Ministry of Land, Infrastructure, and Transport for proactively tackling global environmental issues with the use of rail freight transport.
Carbon Footprint	Kirin Brewery launched Carbon Footprint initiatives together with the beer industry in 2008. The Product Category Rule (PCR), which is the rule for the calculation of beer categories, was approved in February 2011 and revised in December 2013.
Rainforest Alliance Certification Label	The paper drink boxes used for Kirin Gogo-no-Kocha Straight Tea (500 ml) (from the renewed product launched in March 2015) display a Rainforest Alliance certification label.
FSC Certification Label	Kirin aims to switch to FSC-certified paper for all of its paper packaging and containers by 2020. To encourage understanding among consumers about the importance of protecting the forests, we place FSC-certified labels on all containers and packaging where it is possible. In 2019, we began displaying the FSC logo on the top of our 6-can beer packs and cardboard cartons for beer and RTD products. The FSC-certified labels are also displayed on some of the labels for our Sunrise brand of Chilean wines.
ECOCERT	Mercian has been selling Bon Rouge Organic Wine Pet Bottle Red, a wine made with 100% organic fruits, since 2009. This wine is certified by ECOCERT JAPAN, the Japanese subsidiary of the global organic certification body, ECOCERT.
R100 Bottle	From June 2019, we have adopted the R100 Bottle, which is made from 100% recycled PET materials, for our Kirin Nama-cha Decaf green tea beverage.

Education Programs

Name of program	Nature of Activity
Plant Environmental Tours	A total of 2,208 people participated in 96 guided environmental tours of our manufacturing facilities in 2017. These included the Yokohama Plant's "Feel the Blessings of Nature Tour" and the Kobe Plant's "Environmental Tour." Related information→P.28
Kirin School Challenge	Since December 2014, Kirin has been holding Kirin School Challenge workshops with the aims of exchanging opinions with young people, discussing and coming up with ideas about what we should do to "lead the rich blessings of globe to the future." Another aim of the workshops is for junior and senior high school students to convey those ideas to their own generation. These workshops are held eight to ten times a year. reference URL : https://www.kirin.co.jp/csv/eco/schoolchallenge/

Environmental Data Calculation Methods

(1) Usage Factors

Energy Use Conversion Factors (2014 and prior)

	Japan	Overseas
Fuel	"Act on Rationalizing Energy Use" Factors	
Electricity	Used 3.6 (MJ/kWh), which is used by International Energy Agency (IEA) and other organizations	

Energy Use Conversion Factors (2015 and later)

	Japan	Overseas	
Fuel	"Act on Rationalizing Energy Use" Factors	Lion	・Australia - National Greenhouse Account Factors ・New Zealand - Guidance for Voluntary, Corporate Greenhouse Gas Reporting
		Other than the above	"Act on Rationalizing Energy Use" Factors
Electricity	Used 3.6 (MJ/kWh), which is used by International Energy Agency (IEA) and other organizations		

Emission factors for GHG emissions (2014 and prior)

	Japan	Overseas
Fuel	Emission factors from Greenhouse Gas Emissions Calculation and Reporting Manual (Ministry of Environment/Ministry of Economy, Trade & Industry)	
Electricity	Emission factors published by individual power companies	Emission factors by country from IEA CO_2 Emissions from Fuel Combustion for the year in question

Emission factors for GHG Emissions (2015 and after)

	Japan	Overseas	
Fuel	Emission factors from Greenhouse Gas Emissions Calculation and Reporting Manual (Ministry of Environment/Ministry of Economy, Trade & Industry)	Lion	・Australia - National Greenhouse Account Factors ・New Zealand - Guidance for Voluntary, Corporate Greenhouse Gas Reporting
		Other than the above	Emission factors from Greenhouse Gas Emissions Calculation and Reporting Manual (Ministry of Environment/Ministry of Economy, Trade & Industry)
Electricity	・Emission factors published by individual power companies →If none published: Emission factors by country from IEA's CO_2 Emissions from Fuel Combustion for the year in question		

(2) Calculation boundaries

Entire Group

Business	Company
Japan Beer and Spirits Business	Kirin Brewery, Kirin Distillery, SPRING VALLEY BREWERY, Eishogen Kirin Brewery (Zhuhai)
Japan Non-Alcoholic Beverages Business	Kirin Beverage, Shinshu Beverage, Kirin Beverage Value Vendor Hokkaido Kirin Beverage, Kirin Maintenance Service, KIRIN Tropicana each site of Kirin Beverage Service (Hokkaido, Sendai, Tokyo, Chubu, Kansai) Hakodate Daiichi Vending, KIRINVIVAX, Tokai Beverage Service
Oceania Integrated Beverages Business	Lion
Pharmaceuticals and Bio-chemicals Businesses	Kyowa Kirin (Formerly Kyowa Hakko Kirin, name changed in July 2019), Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, Kyowa Hakko Kirin China Pharmaceutical, BioKyowa Inc., Shanghai Kyowa Amino Acid, Thai Kyowa Biotechnologies
Other Businesses (all companies included)	Mercian, NIPPON LIQUOR, Daiichi Alcohol, Wine Curation, Myanmar Brewery Interfood, Vietnam Kirin Beverage, Azuma Kirin, Four Roses Distillery Kirin Holdings, Kirin, Kirin Business Expert, KIRIN BUSINESS SYSTEM, KOIWAI DAIRY PRODUCTS, Kirin Echo, Kirin and Communications, Kirin Engineering, Kirin City, Kirin Techno-System, KIRIN GROUP LOGISTICS

* Where Kyowa Hakko Kirin Entire Group (Global) is mentioned, this indicates the same range as for the Pharmaceuticals and Bio-chemicals Businesses

Breakdown of Calculations by Business

Refer to above "entire Group" calculation boundary table.

Breakdown of Calculations by Region

Region	Company
Japan	Kirin Brewery, Kirin Distillery, SPRING VALLEY BREWERY, EishogenKirin Beverage, Shinshu Beverage, Kirin Beverage Value Vendor Hokkaido Kirin Beverage, Kirin Maintenance Service, KIRIN Tropicana each site of Kirin Beverage Service (Hokkaido, Sendai, Tokyo, Chubu, Kansai) Hakodate Daiichi Vending, KIRINVIVAX, Tokai Beverage Service Kyowa Kirin (Formerly Kyowa Hakko Kirin, name changed in July 2019) Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL KOIWAI DAIRY PRODUCTS, Kirin Echo, Kirin and Communications, Kirin Engineering, Kirin City, Kirin Techno-System, KIRIN GROUP LOGISTICS Mercian, NIPPON LIQUOR, Daiichi Alcohol, Wine Curation, Kirin Holdings, Kirin, Kirin Business Expert, KIRIN BUSINESS SYSTEM
Oceania	Lion
Southeast Asia	Myanmar Brewery, Interfood, Vietnam Kirin Beverag Thai Kyowa Biotechnologies Co., Ltd.
Others	Kyowa Hakko Kirin China Pharmaceutical, BioKyowa Inc., Shanghai Kyowa Amino Acid Kirin Brewery (Zhuhai), Azuma Kirin, Four Roses Distillery

Calculation boundary of actual emissions against mid-term and long-term GHG emission targets (Scope 1, Scope 2) (P.13、P.18、P.21、P.55、P.64、P.91)

Business	Company
Japan Beer and Spirits Business	Kirin Brewery, Kirin Distillery, SPRING VALLEY BREWERY, Eishogen
Japan Non-Alcoholic Beverages Business	Kirin Beverage, Shinshu Beverage, Kirin Beverage Value Vendor Hokkaido Kirin Beverage, Kirin Maintenance Service, KIRIN Tropicana each site of Kirin Beverage Service (Hokkaido, Sendai, Tokyo, Chubu, Kansai) Hakodate Daiichi Vending, KIRINVIVAX, Tokai Beverage Service
Oceania Integrated Beverages Business	Lion
Pharmaceuticals and Bio-chemicals Businesses	Kyowa Kirin, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL Kyowa Hakko Kirin China Pharmaceutical, BioKyowa Inc., Shanghai Kyowa Amino Acid Thai Kyowa Biotechnologies Co., Ltd.
Other Businesses (all companies included)	Mercian, NIPPON LIQUOR, Daiichi Alcohol, Wine Curation, Kirin Kirin Holdings, Kirin, Kirin Business Expert, KIRIN BUSINESS SYSTEM, KOIWAI DAIRY PRODUCTS, Kirin Echo, Kirin and Communications, Kirin Engineering, Kirin City, Kirin Techno-System, KIRIN GROUP LOGISTICS

Calculation boundary of actual emissions against mid-term and long-term GHG emission targets (Scope 3) (P.13、P.18、P.21、P.55、P.64、P.91)

Business	Company
Japan Beer and Spirits Business	Kirin Brewery, Kirin Distillery
Japan Non-Alcoholic Beverages Business	Kirin Beverage, Shinshu Beverage
Oceania Integrated Beverages Business	Lion
Pharmaceuticals and Bio-chemicals Businesses	Kyowa Kirin, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL Kyowa Hakko Kirin China Pharmaceutical, BioKyowa Inc., Shanghai Kyowa Amino Acid Thai Kyowa Biotechnologies Co., Ltd.
Other Businesses (all companies included)	Mercian,Daiichi Alcohol Kirin KOIWAI DAIRY PRODUCTS KIRIN GROUP LOGISTICS

Calculation boundary of Scope 3 emissions (P.90)

Business	Company
Japan Beer and Spirits Business	Kirin Brewery, Kirin Distillery Kirin Brewery (Zhuhai)
Japan Non-Alcoholic Beverages Business	Kirin Beverage, Shinshu Beverage
Oceania Integrated Beverages Business	Lion
Pharmaceuticals and Bio-chemicals Businesses	Kyowa Kirin, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL Kyowa Hakko Kirin China Pharmaceutical, BioKyowa Inc. Shanghai Kyowa Amino Acid Thai Kyowa Biotechnologies Co., Ltd.
Other Businesses (all companies included)	Mercian, Daiichi Alcohol Myanmar Brewery, Interfood, Vietnam Kirin Beverage Kirin KOIWAI DAIRY PRODUCTS KIRIN GROUP LOGISTICS

Breakdown of business locations subject to water risk assessments (P.33, P.38)

Constituent/Name of Group Company	Country	Number of manufacturing plants	Remarks
Kirin Brewery	Japan	8	Sendai, Toride, Yokohama, Nagoya, Shiga, Kobe, Okayama, Fukuoka * Because Kirin Beverage Shiga Plant is attached to Kirin Brewery Shiga Plant, it is included in Kirin Brewery Shiga Plant
Kirin Distillery	Japan	1	Gotemba
Mercian	Japan	1	Yatsushiro
Kirin Beverage	Japan	1	Shonan * Because Kirin Beverage Shiga Plant is attached to Kirin Brewery Shiga Plant, it is included in Kirin Brewery Shiga Plant
Shinshu Beverage	Japan	1	
Kyowa Kirin	Japan	2	Takasaki, Fuji
	China	1	Kyowa Hakko Kirin China Pharmaceutical
Kyowa Hakko Bio	Japan	2	Yamaguchi Production Center (Hofu), Yamaguchi Production Center (Ube)
Kyowa Pharma Chemical	Japan	1	Head office
Koiwai Dairy Products	Japan	1	Koiwai
Biokyowa Inc.	America	1	
Shanghai Kyowa Amino Acid	China	1	
Thai Kyowa Biotechnologies Co., Ltd.	Thai	1	
Kirin Brewery (Zhuhai)	China	1	
Interfood	Vietnam	1	
Vietnam Kirin Beverage	Vietnam	1	
Four Roses Distillery	America	2	Lawrenceburg, Cox's Creek
Myanmar Brewery	Myanmar	1	
Azuma Kirin	Brazil	1	Campinas
Lion	Austraria	12	Bentley Milk, Burnie, Canberra, Castlemaine Perkins Brewery, Chelsea Heights, James Boag Brewery, Little Creatures Brewery Fremantle, Morwell, Penrith, Smithfield, Tooheys Brewery, West End Brewery
	Newzealand	3	Palmerston North, Pride Brewery, Speights Brewery

Environmental Accounting

Environment conservation costs

(Unit：million yen)

Category	Specific details	Investment amounts			Expense amounts		
		2016	2017	2018	2016	2017	2018
Environmental conservation costs to control environmental impact resulting from production and service activity within the business areas (total of ①②③ below)		1,028	1,311	763	4,606	5,971	5,499
① Pollution prevention costs	Air and water pollution prevention activities, analysis and measurement of air and water quality, etc.	594	1,093	533	2,182	3,229	2,477
② Global environmental conservation costs	Solar power generation, CO_2 recovery, energy saving, cogeneration, etc.	242	147	215	743	947	828
③ Resource circulation costs	Reduction of sludge, waste recycling, water recycling, etc.	191	71	16	1,681	1,795	2,195
Upstream / downstream costs	Containers and Packaging Recycling Act, Recycling contracting costs	2	0	1	532	40	584
Administration costs	Operation of environmental management systems, environmental education, greenification in business sites, etc.	58	15	13	342	305	319
Research and development costs	Container lightweighting, R&D regarding mitigation of environmental load of byproducts, wastewater, etc.	0	24	29	99	105	100
Social activities costs	Environmental conservation activity costs such as activities to protect the blessings of water, donations to nature conservation groups, etc.	1	3	0	65	95	47
Environmental remediation costs		0	0	0	0	0	0
Others		0	0	0	1	3	1
Total		1,088	1,353	806	5,645	6,520	6,550

Economic effect

(Unit：million yen)

Items	Details	2016	2017	2018
Proceeds from sales of valuables, etc.	Waste recycling, etc.	777	851	840
Resources saving effects	Energy saving, waste reduction, resources saving, etc.	466	418	555

Calculation boundaries
2016: January - December 2016 (Includes Kirin Brewery, Kirin Beverages, and certain other constituent companies), Kyowa Hakko Kirin, Kyowa Medex, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL , Koiwai Dairy Products
2017: January - December 2017 (Includes Kirin Brewery, Kirin Beverages, and certain other constituent companies), Kyowa Hakko Kirin, Kyowa Medex, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL , Koiwai Dairy Products
2018: January-December 2018: Kirin Brewery, Kirin Distillery, Eishogen, Kirin Beverages, Shinshu Beverages, Mercian, Kyowa Kirin, Kyowa Hakko Bio, KYOWA PHARMA CHEMICAL, Koiwai Dairy Products, Kirin

Material Balance

Material Flow (2018, entire Group)

		Unit	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals and Bio-chemicals Businesses	Other Businesses	Total		
								2018	2017	2016
Substance		thousand t	541	91	246	159	282	1,318	2,452	2,505
		%	41.0	6.9	18.6	12.1	21.4	100.0		
	Raw material	thousand t	362	39	131	157	169	857	1,733	1,746
	Packaging material	thousand t	179	51	115	2	113	460	719	759
Water (fresh water only)		thousand m^3	14,049	2,345	5,378	48,503	6,044	76,319	79,583	81,620
		%	18.4	3.1	7.0	63.6	7.9	100.0		
Water recycling		thousand m^3	3,014	351	224	119,981	433	124,003	61,112	54,611
Energy		TJ	4,098	950	2,426	4,241	1,366	13,081	12,972	12,803
		%	31.3	7.3	18.5	32.4	10.4	100.0		
Production volumes	Alcoholic and non-alcoholic beverages	thousand kL	2,821	713	1,643	0	704	5,881	5,743	5,798
	Food products/Pharmaceuticals and biochemicals	thousand t	8	0	92	80	11	191	188	186
Wastewater		thousand m^3	11,913	1,666	4,159	49,689	4,319	71,747	73,563	71,695
		%	16.6	2.3	5.8	69.3	6.0	100.0		
Greenhouse gas emissions (Scope1+Scope2)		thousand t-CO_2e	232	59	235	359	101	986	996	1,012
		%	23.5	6.0	23.8	36.4	10.3	100.0		
NOx		t	150	20	200	30	35	436	429	431
SOx		t	0	0	1	9	9	19	95	11
Waste products		thousand t	196	19	99	61	46	421	427	407
		%	46.6	4.5	23.4	14.5	10.9	100.0		
	Volume disposed on site	thousand t	0	0	0	11	1	12	35	27
	Volume of recycled waste	thousand t	194	19	95	50	44	402	378	368
	Final disposed volume	thousand t	3	0	4	0.2	1	8	14	12

Water Resources

Trends in water use volumes and water consumption rate (entire Group)

	Water use volume (thousand m³)	Water consumption rate (by sales revenue) (m³/million yen)	
		Japan standard	IFRS
2014	79,314	39	–
2015	80,625	39	–
2016	81,620	42	44
2017	79,583	–	43
2018	76,319	–	40

Trend in water use volumes (by business)

(Unit: thousand m³)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals and Bio-chemicals Businesses	Other Businesses (all companies included)	Total
2014	12,292	2,633	5,807	52,817	5,765	79,314
2015	13,101	2,515	5,444	52,682	6,884	80,625
2016	12,896	2,656	5,514	52,706	7,848	81,620
2017	13,190	2,341	5,469	52,426	6,156	79,583
2018	14,049	2,345	5,378	48,503	6,044	76,319

Trend in water use volumes (by region)

(Unit: thousand m³)

	Japan	Oceania	Southeast Asia	Other	Total
2014	63,165	5,807	490	9,852	79,314
2015	63,292	5,444	2,317	9,573	80,625
2016	62,707	5,514	2,560	10,838	81,620
2017	61,721	5,469	2,500	9,892	79,583
2018	58,120	5,378	2,811	10,011	76,319

Trends in annual water use volumes by water source (entire Group)

	Unit	Fresh water					Total
		Service water	Rivers (including industrial water)	Underground water	Storm water	Gray water* (Reclaimed water)	
2014	thousand m³	9,473	39,751	30,061	1	28	79,314
	%	12	50	38	0.0	0.0	100
2015	thousand m³	10,155	40,374	30,067	0	30	80,625
	%	13	50	37	0.0	0.0	100
2016	thousand m³	9,946	41,375	30,289	2	8	81,620
	%	12	51	37	0.0	0.0	100
2017	thousand m³	9,765	42,150	27,667	1	0	79,583
	%	12	53	35	0.0	0.0	100
2018	thousand m³	10,312	40,415	25,592	0	0	76,319
	%	14	53	34	0.0	0.0	100

* Externally supplied gray water

Trend in water use volumes of Japan Integrated Beverages Business

	Unit	Kirin Brewery	Kirin Distillery	Kirin Beverage	Shinshu Beverage	Mercian
2014	thousand m³	10,579	1,109	1,376	1,257	4,839
	m³/kL	4.8	3.1	3.6	6.2	38.4
2015	thousand m³	11,104	1,274	1,309	1,205	5,041
	m³/kL	4.9	3.3	3.4	5.4	39.3
2016	thousand m³	11,009	1,324	1,359	1,297	4,317
	m³/kL	5.0	3.1	2.9	5.2	32.6
2017	thousand m³	11,199	1,383	968	1,374	3,391
	m³/kL	5.3	3.2	2.2	5.2	25.5
2018	thousand m³	12,006	1,379	971	1,374	3,240
	m³/kL	5.3	3.1	2.1	5.3	22.5

* Because Kirin Beverage Shiga Plant is attached to Kirin Brewery Shiga Plant, it is included in Kirin Brewery Shiga Plant

Trend in use of recycled water in entire Group manufacturing plants and business locations

	Unit	Cyclical use			Recycling rate (%)
		Re-used water	Recycled water	Total	
2104	thousand m³	13,020	88,348	101,368	56
	%	12.8	87.2	100.0	
2015	thousand m³	13,508	91,386	104,894	57
	%	12.9	87.1	100.0	
2016	thousand m³	13,386	86,180	99,566	55
	%	13.4	86.6	100.0	
2017	thousand m³	15,123	90,944	106,067	57
	%	14.3	85.7	100.0	
2018	thousand m³	18,993	105,010	124,003	62
	%	15.3	84.7	100.0	

Trend in wastewater volume by destination (entire Group)

	Unit	Wastewater volume				
		Sewage water	Direct release into rivers, etc.	Indirect release into ocean	Other*	Total
2014	thousand m³	7,452	26,048	38,067	302	71,869
	%	10	36	53	0.4	100
2015	thousand m³	6,247	27,890	36,768	8	70,913
	%	9	39	52	0.0	100
2016	thousand m³	6,620	27,068	37,898	109	71,695
	%	9	38	53	0.2	100
2017	thousand m³	7,224	27,679	38,559	102	73,563
	%	10	38	52	0.1	100
2018	thousand m³	6,980	26,063	38,604	99	71,747
	%	10	36	54	0.1	100

* Water sprayed onto forest areas

Containers and Packaging

Volume of resources used in containers and packaging

	Unit	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals and Bio-chemicals Businesses	Other Businesses (all companies included)	Total
2014	thousand t	186	142	343	3	35	709
	%	26.3	20.0	48.4	0.4	4.9	100.0
2015	thousand t	204	152	281	2	114	752
	%	27.1	20.2	37.3	0.3	15.1	100.0
2016	thousand t	208	45	391	2	113	759
	%	27.4	6.0	51.4	0.3	14.9	100.0
2017	thousand t	219	51	332	2	116	719
	%	30.4	7.0	46.1	0.3	16.1	100.0
2018	thousand t	179	51	115	2	113	460
	%	38.9	11.1	24.9	0.5	24.5	100.0

Volume of resources used by container(Major companies in Japan)

(Unit : t)

		Aluminum cans	PET bottles	Glass bottles	Cartons	6-can packs
2014	Volume reduction	19,295	8,771	606	5,187	2,691
	Volumes used	80,040	61,165	34,328	95,707	16,075
2015	Volume reduction	18,908	9,517	792	5,598	3,758
	Volumes used	82,605	58,866	32,668	102,113	15,522
2016	Volume reduction	18,795	11,326	960	8,012	3,564
	Volumes used	80,430	63,000	33,532	0	0
2017	Volume reduction	30,031	7,710	1,332	8,792	3,444
	Volumes used	66,915	60,561	31,276	102,693	14,499
2018	Volume reduction	16,587	11,936	0	5,096	3,629
	Volumes used	73,724	66,894	31,183	61,494	6,175

* Reduction volumes are totals for Kirin Brewery and Kirin Beverage, use volumes are totals for Kirin Brewery, Kirin Beverage, and Mercian.

(Ref.) Trends in recycling rates of other containers in Japan

The Kirin Group pursues initiatives in cooperation with Japanese industry organizations involved in container recycling

		2013	2014	2015	2016	2017	Target*
Aluminum cans	Weight of consumed(thousand t)	304	313	332	341	336	—
	Recycled weight(thousand t)	255	273	299	315	310	—
	Recycling rate(%)	83.8	87.4	90.1	92.4	92.5	≥90
Steel cans	Weight of consumed(thousand t)	611	571	486	463	451	—
	Recycled weight(thousand t)	567	525	451	435	422	—
	Recycling rate(%)	92.9	92.0	92.9	94.0	93.4	≥85
PET bottles	Sales volume of specified PET bottles (thousand t)	578.706	569	563	596	587	—
	Recycling volume in Japan(thousand t)	258	271	262	279	298	—
	Recycling volume outside Japan (thousand t)	239	199	227	221	201	—
	Recycling volume of used PET bottle (thousand t)	497	470	489	500	498	—
	Recycling rate(%)	85.8	82.6	86.9	83.9	84.8	≥85
Glass bottles	Melted weight(thousand t)	1702	1652	1618	1606	1583	—
	Cullet usage volume(thousand t)	1274	1230	1228	1211	1189	—
	Cullet usage rate(%)	74.8	74.4	75.9	75.4	75.1	≥90
	Recycling rate(%)	67.3	69.8	68.4	71.0	69.2	—

* Recycling target of 2nd Voluntary Action Plan

State of sale and collection of returnable glass bottles (Kirin Brewery)

	Sale volumes(million bottles)	Collected volume(million bottles)	Collection rate (%)
2014	263.1	261.7	99
2015	248.7	247.1	99
2016	232.0	232.7	100
2017	224.6	227.8	101
2018	205.1	203.2	99

* Total of major returnable bottles (large, medium, small bottles)
* Kirin Brewery is engaged in the re-use of beer bottles and commercial large draft kegs. With the diversification of containers, the volume of returnable bottles used has fallen, but the collection rate is 99%.Kirin Beverage also uses returnable bottles for Kirin Lemon and other products and has a collection rate of nearly 100%.

Global Warming

Actual results for Fiscal 2018 marked with ☑ have received independent assurance by KPMG AZSA Sustainability Co., Ltd.in accordance with International Standard on Assurance Engagements (ISAE) 3000 and ISAE3410.

Trends in greenhouse gas emissions

■ Scope 1 (direct emissions) + Scope 2 (indirect emissions from energy use)

Trends in greenhouse gas emissions and emissions intensity (entire Group)

	Greenhouse gas emissions (thousand tCO_2e)		Greenhouse gas emissions intensity (per unit of sales) (tCO_2e/million yen)	
		(of which, CO_2)	Japan standard	IFRS
2014	963	(963)	0.48	–
2015	1,004	(1,002)	0.49	–
2016	1,012	(1,010)	0.52	0.55
2017	996	(995)	–	0.53
2018	986	(983)	–	0.51

Trends in greenhouse gas emissions (by business)

(Unit : thousand tCO_2e)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals and Bio-chemicals Businesses	Other Businesses (all companies included)	Total ☑
2014	235	67	258	338	64	963
2015	239	68	258	360	79	1,004
2016	233	70	251	363	95	1,012
2017	231	61	247	363	95	996
2018	232	59	235	359	101	986

Trends in greenhouse gas emissions (by region)

(Unit : thousand tCO_2e)

	Japan	Oceania	Southeast Asia	Other	Total ☑
2014	600	258	9	96	963
2015	597	258	32	116	1,004
2016	593	251	46	122	1,012
2017	581	247	50	119	996
2018	570	235	57	124	986

Trends in greenhouse gas emissions and emission intensities from manufacturing plants

(a) Kirin Brewery

	Greenhouse gas emissions (thousand tCO_2e)	Greenhouse gas emissions intensity ($kgCO_2e/kL$)
2014	180	83
2015	177	79
2016	174	80
2017	170	80
2018	171	75

(b) Kirin Beverage

	Shonan Plant	
	Greenhouse gas emissions (thousand tCO_2e)	Greenhouse gas emissions intensity ($kgCO_2e/kL$)
2014	29	90
2015	28	90
2016	31	77
2017	28	64
2018	27	60

(c) Mercian

	Greenhouse gas emissions (thousand tCO_2e)
2014	25
2015	26
2016	28
2017	29
2018	30

Trends in energy usage (entire Group)

Energy usage by type	2014	2015	2016	2017	2018
Total usage (TJ)	12,129	12,426	12,803	12,972	13,081
Coal (t)	1,938	1,403	1,758	2,294	2,339
Gasoline (kL)	3,425	4,734	3,887	3,600	3,621
Kerosene (kL)	94	87	166	1,466	1,399
Diesel oil (kL)	5,016	11,399	12,242	13,790	12,611
Heavy fuel oil (kL)	11,515	10,544	11,674	12,475	14,006
LPG (t)	2,616	2,711	2,623	3,334	3,356
Town gas (thousand Nm^3)	106,862	108,465	111,648	110,950	112,987
LNG (t)	0	0	0	0	0
Purchased electricity (MWh)	753,267	780,123	818,925	811,123	811,507
Renewable electricity (MWh)	937	815	843	937	844
Purchased steam (TJ)	2,014	1,963	1,979	1,925	1,886
Other (TJ)	1,669	1,680	1,662	1,771	1,811

Breakdown and Trends in Greenhouse Gas Emissions

■ Scope 1 (direct emissions)

Trends in greenhouse gas emissions from fuel use (by business) (Unit: thousand tCO_2e)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals and Bio-chemicals Businesses	Other Businesses (all companies included)	Total ☑
2014	154	44	73	70	29	369
2015	158	45	82	64	42	391
2016	159	45	77	64	56	401
2017	164	44	74	68	56	405
2018	168	42	74	68	60	412

Trends in greenhouse gas emissions from fuel use (by region)

(Unit: thousand tCO_2e)

	Japan	Oceania	Southeast Asia	Other	Total
2014	252	73	5	40	369
2015	254	82	17	37	391
2016	259	77	18	47	401
2017	266	74	21	44	405
2018	271	74	21	46	412

Breakdown of greenhouse gas emissions in Scope 1(2018)

(Unit: thousand tCO_2e)

CO_2	CH_4	N_2O	HFCs	PFCs	SF_6
411	0.3	<0.1	0.3	0	0

Scope 2 (indirect emissions from energy use)

Trends in greenhouse gas emissions from electricity and steam purchases (by business)

(Unit: thousand tCO_2e)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals and Bio-chemicals Businesses	Other Businesses (all companies included)	Total
2014	81	24	186	267	35	594
2015	81	23	176	296	37	613
2016	74	26	174	299	39	611
2017	67	17	173	296	39	591
2018	64	17	161	291	42	574

Trends in greenhouse gas emissions from electricity and steam purchases (by region)

(Unit: thousand tCO_2e)

	Japan	Oceania	Southeast Asia	Other	Total
2014	348	186	4	56	594
2015	342	176	15	79	613
2016	334	174	28	75	611
2017	315	173	28	75	591
2018	299	161	36	79	574

Scope3 (other indirect emissions)

Trends in CO_2 emissions by other parties related to business activities (by business)

See P. 83 for calculation boundaries

(Unit: thousand tCO_2)

	Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals and Bio-chemicals Businesses	Other Businesses (all companies included)	Total
2014	1,488	976	920	299	457	4,140
2015	1,553	1,037	1,314	242	416	4,561
2016	1,521	1,099	800	246	535	4,200
2017	1,413	1,060	1,083	265	542	4,364
2018	1,483	1,060	882	273	586	4,284

Trends in CO_2 emissions by other parties related to business activities (by region)

See P. 83 for calculation boundaries

(Unit: thousand tCO_2)

	Japan	Oceania	Southeast Asia	Other	Total
2014	3,181	920	1	39	4,140
2015	3,209	1,314	0	39	4,561
2016	3,244	800	112	44	4,200
2017	3,081	1,083	152	47	4,364
2018	3,145	882	209	48	4,284

Trends in CO_2 emissions*1 accompanying transportation volumes and distances (Japan)

	Business	Kirin Brewery	Kirin Beverage	Mercian	Total
2013	Transport volumes (thousand ton kilometer)	564,105	809,530	76,074	1,449,709
	CO_2 emissions (thousand tons-CO_2)	49	68	7	124
2014	Transport volumes (thousand ton kilometer)	589,483	706,443	99,654	1,395,580
	CO_2 emissions (thousand tons-CO_2)	49	60	7	116
2015	Transport volumes (thousand ton kilometer)	604,865	791,106	85,488	1,481,459
	CO_2 emissions (thousand tons-CO_2)	51	66	8	125
2016	Transport volumes (thousand ton kilometer)	641,171	830,808	87,036	1,559,015
	CO_2 emissions (thousand tons-CO_2)	52	71	8	131
2017	Transport volumes (thousand ton kilometer)	735,996	822,256	87,904	1,646,156
	CO_2 emissions (thousand tons-CO_2)	55	68	8	131

*1 Tally period is April to March of following year for each year. Calculated within the reporting scope of specified consigners, in line with the calculation standards of the Act on Rationalizing Energy Use.

Independent Assurance

The Kirin Group has been receiving independent assurances to ensure the reliability and transparency of information disclosed.
The Kirin Group has engaged an independent third party to provide assurance on the 2018 CO_2 emissions in Scope 1 and 2 from the entire Kirin Group and those in Scope 3 from the Japan Integrated Beverage Business. The independent assurance report is shown on Page 99.

Calculation results of Scopes 1 and 2 for the entire Kirin Group*1 (2018) ☑

(Unit:tCO2e/year)

Scope1	Scope2
411,747	574,169

Calculation results of Scope 3 for Japan Integrated Beverages Business*2 (2018) ☑

(Unit:tCO2/year)

Upstream／Downstream		Scope3 Categories	Calculation results	Remarks
Upstream	1	Products and services purchased	1,655,118	Calculated by multiplying the purchased volume of raw materials, etc. by the CO_2 emission factors for producing each type of raw material, etc.
	2	Capital goods	-	Not calculated
	3	Fuel and energy-related activities not included in Scopes 1 and 2	50,782	Calculated by multiplying the purchased volume of fuel or electricity by CO_2 emissions factors for each energy type
	4	Transportation and delivery (upstream)	329,657	Calculated by multiplying the shipping volume of products as shipper and the purchased volume of raw materials, etc. by the distance of transportation and then by the CO_2 emission factors for each transportation method (the amount of CO_2 emissions based on shipping volume of products as shipper is calculated using FY2017 data)
	5	Waste from operations	10,030	Calculated by multiplying the amount of waste discharged, etc. by the CO_2 emission factors for each disposal method
	6	Business travel	2,308	Calculated by multiplying the number of employees by the annual average distance of transportation and then by the CO_2 emission factors for each means of transportation
	7	Employee commuting	6,557	Calculated by multiplying the number of employees by the annual average distance of transportation and then by the CO_2 emission factors for each means of transportation
	8	Leased assets (upstream)	-	Included in Scopes 1 and 2
Downstream	9	Transportation and delivery (downstream)	742,995	Customer: Calculated by multiplying the product sales volume by the CO_2 emission factors for selling products for each sales method Vending machines: Calculated by multiplying the estimated power consumption of vending machines in operation by the CO_2 emission factor for electricity
	10	Processing of sold products	-	Not applicable
	11	Use of sold products	21,985	Calculated by multiplying the product sales volume by the estimated power consumption per product unit amount in homes, etc. and by the CO_2 emission factors for electricity
	12	Disposal of sold products	59,250	Calculated by multiplying the amount of containers and packaging disposed of by the CO_2 emission factors for each type of container and packaging
	13	Leased assets (downstream)	-	Not applicable
	14	Franchises	-	Not applicable
	15	Investments	-	Not applicable
Total			2,878,682	

Progress toward Mid-Term Greenhouse Gas Emission Reduction Targets Through SBTs*3 (2018)

See P. 83 for calculation boundaries

(Unit:tCO2e/year)

Scope1+2

		total
Scope1+Scope2		927,337
	Scope1	375,096
	Scope2	552,241
Reduction rate (compared to 2015 base year)		-3.8%

Scope3

				total
Scope3				4,092,881
	Upstream	1	Products and services purchased	2,446,307
		2	Capital goods	0
		3	Fuel and energy-related activities not included in Scopes 1 and 2	142,437
		4	Transportation and delivery (upstream)	365,183
		5	Waste from operations	43,302
		6	Business travel	9,822
		7	Employee commuting	10,099
		8	Leased assets (upstream)	0
	Downstream	9	Transportation and delivery (downstream)	923,083
		10	Processing of sold products	0
		11	Use of sold products	32,776
		12	Disposal of sold products	119,872
		13	Leased assets (downstream)	0
		14	Franchises	0
		15	Investments	0
Reduction rate (compared to 2015 base year)				-10.2%

*1 Methods of calculating Scope 1 and 2 emissions
- Fuel: Lion calculates emissions according to the calculation standards set by the Australian and New Zealand governments.
  All other manufacturing sites calculate emissions according to the calculation standards in Japan's Act on Promotion of Global Warming Countermeasures and Act on Rationalizing Energy Use.
- Electricity: Calculated by multiplying the amount of purchased electricity by the CO_2 emission factors published by the individual power companies (or, if there are no published figures, by the country-specific emission factor published by the IEA).
- Greenhouse gas emissions include the greenhouse gas emissions from sold electricity.

*2 Companies included in calculations: Kirin Brewery, Kirin Distillery, Kirin Group Logistics, Kirin Beverage, Shinshu Beverages, Mercian, Daiichi Alcohol, and Kirin

*3 30% reduction by 2030 compared to 2015 levels.

Trends in biogas electricity and biogas generated at Kirin Brewery plans

	Biogas electricity generated (Unit: million kWh)	Biogas generated (Unit: thousand Nm³)
2014	20.1	8,588
2015	20.5	8,967
2016	21.2	8,593
2017	19.2	8,115
2018	18.6	8,689

Breakdown of purchased electricity (Kirin Brewery plants)

(Unit:thousand kWh)

			2017	2018
Purchased electricity	Renewable energy through energy mix		16,089	18,054
	Other than renewable energy		94,112	94,782
	Power Certificates	Hydro-electric power	15,184	20,627
		Wind power	0	0
	Total		125,386	133,462
Renewable energy/purchased electricity (%)			25%	29%

Breakdown of electricity usage (entire Group)

(Unit:thousand kWh)

			2017	2018
Purchased electricity	Other than Power Certificates		787,561	780,192
	Power Certificates	Hydro-electric power	22,912	30,813
		Wind power	650	502
		Total	23,562	31,315
Private power generated	Other than renewable energy		252,413	210,472
	Biogas-generated electricity		19,189	19,099
	Solar-generated electricity		287	342
Electricity usage			1,082,169	1,039,669
	Of which, renewable energy (excluding energy mix)		43,037	50,757

Trend in annual electricity consumption per one can and bottle vending machine shipped

	Annual electricity consumption(Unit: kWh/year)
2014	726
2015	708
2016	724
2017	712
2018	702

Source: Japan Vending Machine Manufacturers Association

Reduction of waste and prevention of pollution

Volume of waste generated (2018)

(Unit: thousand tons. Figures in brackets: %)

Japan Beer and Spirits Business	Japan Non-Alcoholic Beverages Business	Oceania Integrated Beverages Business	Pharmaceuticals and Bio-chemicals Businesses	Other Businesses (all companies included)	Total
196 (47)	19 (4)	99 (23)	61 (15)	46 (11)	421 (100)

Trends in volume of waste generated and recycling rates (Japan)

	Volume of waste generated (thousand t)	Volume disposed on site (thousand t)	Volume of recycled waste (thousand t)	Final disposed volume (thousand t)	recycling rates (%)
2014	244	20	224	0.4	99.8
2015	228	14	213	0.5	99.8
2016	237	17	219	0.4	99.8
2017	243	24	219	0.6	99.7
2018	346	12	333	0.7	99.8

Wastewater quality

	COD (t)			Nitrogen (t)			Phosphorous (t)		
	Japan	Overseas	Total	Japan	Overseas	Total	Japan	Overseas	Total
2017	675	3,557	4,232	396	954	1,350	53	271	324
2018	742	3,127	3,869	344	826	1,170	45	220	265
Y/Y change	67	-430	-363	-52	-128	-180	-8	-51	-59

Trend in emissions of air pollutants

Trends in emissions of NOx and SOx (entire Group)

(Unit:t)

	NOx	SOx
2014	275	53
2015	271	71
2016	442	64
2017	431	95
2018	436	19

Trends in emissions of VOCs (Japan Pharmaceuticals and Bio-chemicals Businesses)

(Unit:t)

	Methanol	Acetone	Substances subject to PRTR Act	Ethyl acetate, etc.	Total
2014	373	33	64	138	608
2015	376	32	57	105	570
2016	324	21	55	88	488
2017	417	21	62	97	596
2018	308	13	57	103	481

Soil Investigations Status (2018)

Number of investigations	Area of investigations (m^2)
14	40,030

Targets regarding chemical substances

Kyowa Kirin Group
50% reduction of VOC emissions in 2020 compared to FY2003 levels

Status of PCB management (2018)

High-concentration capacitors, reactors, etc.	Trace-quantity capacitor reactors, etc.	High-concentration stabilizers	Trace-quantity stabilizers
5	27	915	109

Status of asbestos management (2018)

Number of buildings	Area (m²)
4 buildings	2,590

Status of HCFC management (2018)

Number of offices	Weight (kg)
14 locations	25,486

Status of HFC management (2018)

Number of offices	Weight (kg)
6 locations	16,289

Status of Environmental Management Certifications

Status as of July 2019

Japan

Number of independently certified business locations	7
Number of business locations making self-declaration of conformity	21
Certification rate (%)	100

Overseas

Number of certified business locations	29
Number of uncertified business locations	8
Certification rate (%)	78

GRI Contents Index

This report uses the following disclosure matters of the GRI Standard 2016 as reference.

GRI Contents Index Standard	Disclosure matters	Page number or URL
GRI 102	102-1	P.5
	102-2	P.5 https://www.kirinholdings.co.jp/english/company/business/index.html
	102-3	P.5
	102-4	P.5 https://www.kirinholdings.co.jp/english/company/organization/index.html
	102-5	P.5
	102-6	P.5 https://www.kirinholdings.co.jp/english/ir/finance/segment.html https://www.kirinholdings.co.jp/english/ir/private/global.html
	102-7	P.5 ESG Data Profile(https://www.kirinholdings.co.jp/english/csv/esg_gri/esg.html) https://www.kirinholdings.co.jp/english/company/organization/index.html
	102-8	P.5 ESG Data Profile、Employees(https://www.kirinholdings.co.jp/english/csv/esg_gri/esg.html)
	102-9	P.8, 22, 32, 40, 54 https://www.kirinholdings.co.jp/english/csv/safety/policies.html https://www.kirinholdings.co.jp/english/csv/procurement/csr.html
	102-10	P.3, 82-84 ESG Data Notes (https://www.kirinholdings.co.jp/english/csv/esg_gri/esg.html)
	102-11	P.8, 11-16, 68-69 https://www.kirinholdings.co.jp/english/csv/governance/risk_management.html
GRI 102	102-12	P.79-81 https://www.kirinholdings.co.jp/english/csv/sustainability/gc.html https://www.kirinholdings.co.jp/english/csv/human_resources/promote.html
	102-13	P.79, 80 https://www.kirinholdings.co.jp/english/csv/sustainability/gc.html https://www.kirinholdings.co.jp/english/csv/alcohol/policies.html
	102-14	P.4, 6-7 https://www.kirinholdings.co.jp/english/csv/story/ https://www.kirinholdings.co.jp/english/ir/library/integrated/2016/message01.html
	102-15	P.8, 11-16, 23, 33 https://www.kirinholdings.co.jp/english/ir/policy/risks.html https://www.kirinholdings.co.jp/english/csv/materiality/
	102-16	https://www.kirinholdings.co.jp/english/company/philosophy/ https://www.kirinholdings.co.jp/english/csv/governance/compliance.html
	102-18	P.67-70 https://www.kirinholdings.co.jp/english/ir/policy/management.html ESG Data Governance (https://www.kirinholdings.co.jp/english/csv/esg_gri/esg.html)
	102-40	P.74-75, 79-81 https://www.kirinholdings.co.jp/english/csv/sustainability/stakeholder.html
	102-41	ESG Data Employees (https://www.kirinholdings.co.jp/english/csv/esg_gri/esg.html)
	102-42	P.74-75, 79-81 https://www.kirinholdings.co.jp/english/csv/sustainability/stakeholder.html

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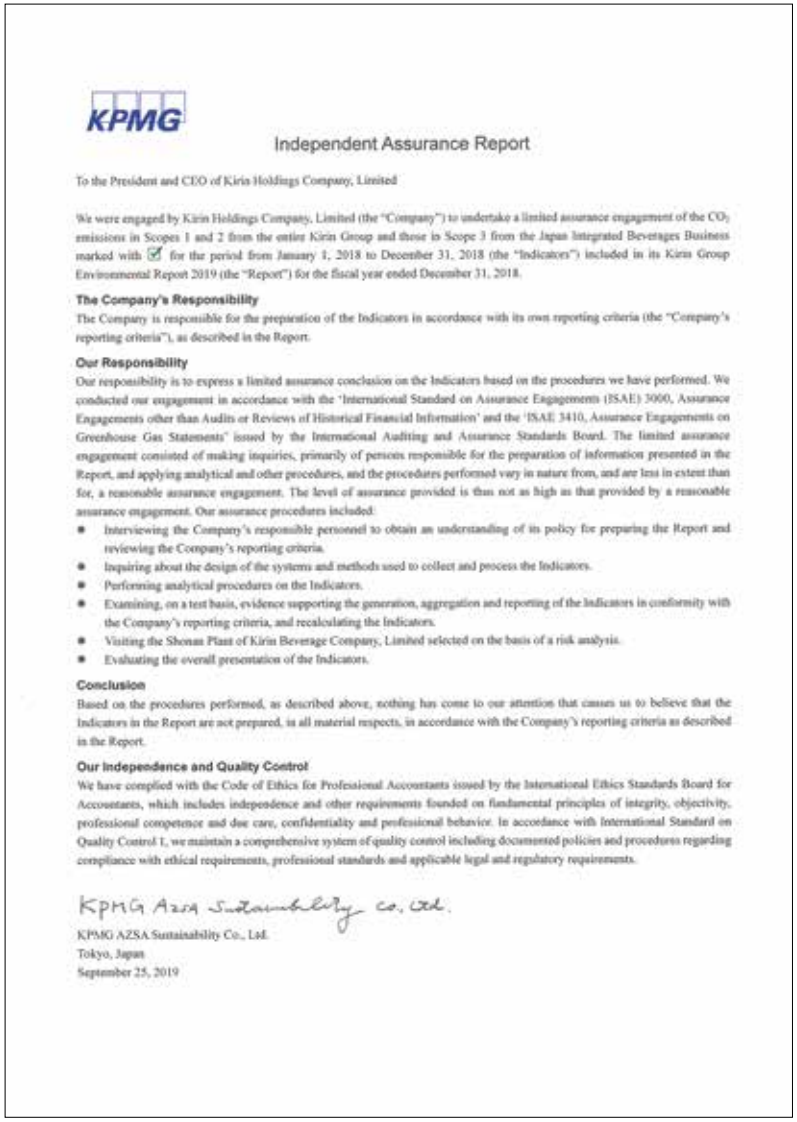
Recommended Disclosure		Page
Governance	a) Describe the board's oversight of climate-related risks and opportunities.	P.67-70
	b) Describe management's role in assessing and managing climate-related risks and opportunities.	P.67-70
Strategy	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	P.8, 11-16
	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	P.12-16
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2° C or lower scenario.	P.14-16
Risk Management	a) Describe the organization's processes for identifying and assessing climate-related risks.	P.68
	b) Describe the organization's processes for managing climate-related risks.	P.68-70
	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	P.68-69
Metrics and Targets	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	P.8, 9, 17, 55
	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	P.55, 64, 65, 85, 88-91
	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	P.8, 9, 17, 18, 21, 55

Independent Assurance Report



KPMG

Independent Assurance Report

To the President and CEO of Kirin Holdings Company, Limited

We were engaged by Kirin Holdings Company, Limited (the "Company") to undertake a limited assurance engagement of the CO_2 emissions in Scopes 1 and 2 from the entire Kirin Group and those in Scope 3 from the Japan Integrated Beverages Business marked with ☑ for the period from January 1, 2018 to December 31, 2018 (the "Indicators") included in its Kirin Group Environmental Report 2019 (the "Report") for the fiscal year ended December 31, 2018.

The Company's Responsibility

The Company is responsible for the preparation of the Indicators in accordance with its own reporting criteria (the "Company's reporting criteria"), as described in the Report.

Our Responsibility

Our responsibility is to express a limited assurance conclusion on the Indicators based on the procedures we have performed. We conducted our engagement in accordance with the 'International Standard on Assurance Engagements (ISAE) 3000, Assurance Engagements other than Audits or Reviews of Historical Financial Information' and the 'ISAE 3410, Assurance Engagements on Greenhouse Gas Statements' issued by the International Auditing and Assurance Standards Board. The limited assurance engagement consisted of making inquiries, primarily of persons responsible for the preparation of information presented in the Report, and applying analytical and other procedures, and the procedures performed vary in nature from, and are less in extent than for, a reasonable assurance engagement. The level of assurance provided is thus not as high as that provided by a reasonable assurance engagement. Our assurance procedures included:

- Interviewing the Company's responsible personnel to obtain an understanding of its policy for preparing the Report and reviewing the Company's reporting criteria.
- Inquiring about the design of the systems and methods used to collect and process the Indicators.
- Performing analytical procedures on the Indicators.
- Examining, on a test basis, evidence supporting the generation, aggregation and reporting of the Indicators in conformity with the Company's reporting criteria, and recalculating the Indicators.
- Visiting the Shonan Plant of Kirin Beverage Company, Limited selected on the basis of a risk analysis.
- Evaluating the overall presentation of the Indicators.

Conclusion

Based on the procedures performed, as described above, nothing has come to our attention that causes us to believe that the Indicators in the Report are not prepared, in all material respects, in accordance with the Company's reporting criteria as described in the Report.

Our Independence and Quality Control

We have complied with the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which includes independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. In accordance with International Standard on Quality Control 1, we maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

KPMG AZSA Sustainability Co., Ltd.

KPMG AZSA Sustainability Co., Ltd.
Tokyo, Japan
September 25, 2019

Joy brings us together

KIRIN

Contact Us

https://www.kirinholdings.co.jp/english/customer/